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FOR
WASTEWATER TREATMENT

CITY OF FORT WAYNE, INDIANA

SECOND AMENDMENT
ADVANCED WASTE TREATMENT FACILITIES

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FACILITIES PLAN
FOR
WASTEWATER TREATMENT

CITY OF FORT WAYNE, INDIANA

SECOND AMENDMENT
ADVANCED WASTE TREATMENT FACILITIES

MAY, 1976
REVISED DECEMBER, 1976
SUBMITTED JUNE, 1977
FEDERAL GRANT NO. C 180774-01

HENRY B. STEEG & ASSOCIATES
DIVISION OF
HOWARD NEEDLES TAMMEN & BERGENDOFF
Architects Engineers Planners
Indianapolis, Indiana

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SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

PURPOSE

As a result of decisions reached in 1974, the wastewater treatment plant expansion project now under construction at Fort Wayne does not include provisions for final advanced waste treatment facilities. It is the purpose of this Facilities Plan Amendment to continue the wastewater treatment planning process to identify the most cost-effective system for advanced waste treatment at Fort Wayne.

EFFLUENT LIMITATIONS

The City's National Pollutant Discharge Elimination System (NPDES) Permit, which became effective January 29, 1975, established the effluent quality requirements for the Water Pollution Control Plant. The limitations of principal concern to this study are (1) biochemical oxygen demand (BOD_5) and suspended solids not to exceed a limit of 10 mg/1 monthly or 15 mg/1 weekly year-round, (2) ammonia-nitrogen not to exceed a limit of 1.3 mg/1 maximum daily average for the summer months of June, July, and August, and 2.5 mg/1 maximum daily average for the remainder of the calendar year. These limitations are to take effect by the completion of the construction of the Selected Alternate outlined below. This selected plan involves stage-wise construction scheduled over a three-year period.

REVIEW OF CURRENT AND PREDICTED FUTURE CONDITIONS

The designation of the project planning area and discussion of significant current conditions therein is presented in Chapter II and, by reference, in the previously prepared Master Plan for Wastewater Treatment (January, 1972), Facilities Plan (January, 1974), and first Facilities Plan Amendment (April, 1974).

A detailed description of the existing Water Pollution Control Plant is also presented in Chapter II, and it is noted that the plant is not currently capable of meeting the final NPDES effluent limitations.

Since this study is viewed as a continuation of the facilities planning effort which led to the current construction project, and since relatively little time has elapsed since the original Facilities Plan work was done, it was not considered necessary to reinvestigate the required plant hydraulic capacity. Accordingly, the required hydraulic capacity of the advanced waste treatment facilities was established as 60 MGD. To remain consistent with the planning period for which that capacity requirement was originally determined, the remaining planning period for the advanced waste treatment project was established as fifteen years.

DEVELOPMENT AND EVALUATION OF ALTERNATIVES

After review of "non-treatment" alternatives such as waste reduction and water reuse, and examination of regionalization of waste treatment services, it was concluded that for the duration of the planning period a need will exist for a 60 MGD waste treatment facility at the location of the Water Pollution Control Plant on Dwenger Avenue. The process capability of the existing facilities will have to be augmented to allow the plant to produce an effluent conforming to the Permit limitations.

A thorough review was made of all wastewater treatment processes which were considered potentially applicable for the Fort Wayne plant, and twenty-one such processes were identified for further evaluation. After a series of progressively more detailed evaluations, the list was reduced to fifteen processes. At this point, it was recognized that the available information was insufficient to allow the confident selection of the apparent least-cost alternatives. The principal treatment requirement of concern in this regard was the need to reduce effluent ammonia-nitrogen to less than 2 to 3 mg/l. An extensive testing program was undertaken, therefore, to obtain the data necessary for a rational final process selection.

Pilot and Prototype Studies

Detailed studies of two pilot-scale and two full-scale prototype operations were conducted at the Water Pollution Control Plant from October, 1975, to April, 1976. Interim reports describing the plans, progress, and preliminary findings of these studies were submitted in July and October, 1975, and February, 1976.

The objective of this testing program was to resolve the following questions:

1. Can the existing activated sludge process units be operated to provide both carbon oxidation and nitrification of ammonia, and, if so, what structural or equipment modifications will be required to provide this capability at the design rate of 60 MGD?
2. Can the existing terminal ponds, as they exist or with modifications, be made to provide adequate tertiary treatment in conjunction with a nitrification process to meet the final NPDES Permit effluent limitations?
3. Can the anaerobic digestion supernatant be successfully nitrified on a rotating biological contactor, and is such treatment necessary to assure satisfactory overall ammonia-nitrogen control?

As implied by the cost estimates in Table IV/2, the potential savings to be realized if either single stage nitrification or terminal pond tertiary treatment, or both, could be demonstrated to be feasible amounted to several million dollars.

These studies provided a great deal of important and useful information concerning the nature and treatability of the Fort Wayne Wastewater and achieved their principal purpose by providing the data upon which to base final process selection and design.

Alternative Processes Selected for Final Evaluation

With the conclusion drawn from the on-site studies as well as those derived from "desk studies" which continued during the testing program, the list of candidate processes was reduced to six for final detailed evaluation. These six were:

For oxidation of organic carbon and ammonia nitrification

1. Single stage biological treatment employing the existing activated sludge process facilities with equipment and operational modifications.
2. Two stage biological treatment employing the existing activated sludge system followed by a suspended growth, cell recycle (activated sludge type) nitrification process on the north side of the river.
3. Two stage biological treatment employing the existing activated sludge system followed by a fixed film (trickling filter type) nitrification process on the north side of the river.

For auxiliary ammonia-nitrogen control capability

4. Breakpoint chlorination employing the existing system with equipment and distribution piping modifications.

For tertiary removal of suspended solids and BOD_5

5. Dual media gravity filtration with a new system constructed on the north side of the river, with the optional capability to use Pond No. 3 following or in lieu of filtration.

For effluent oxygenation

6. An effluent weir and cascade incorporated into the filter structure.

These six processes were combined into three alternate advanced waste treatment systems for comparative evaluation. Each of these three alternate treatment sequences would be capable of producing a final effluent quality in compliance with the NPDES Permit requirements.

Alternate A (Single Stage Nitrification). This Alternate employs processes 1, 4, 5 and 6 from the list given above, and makes maximum use of the existing facilities.

Alternate B (Two Stage Nitrification - Activated Sludge). This Alternate employs processes 2, 4, 5 and 6 from the list given above.

Alternate C (Two Stage Nitrification - Trickling Filters). This Alternate employs processes 3, 4, 5 and 6 from the list given above.

Final Evaluation and Plan Selection

These three Alternates were then thoroughly evaluated on the basis of cost, environmental impact, and implementation requirements.

The conclusion of that evaluation was that Alternate A, employing single-stage activated sludge nitrification, is strongly favored on a cost-effectiveness basis, having a project present worth of approximately one-half that of Alternate C and only 60% of Alternate B. Since all three Alternates are essentially equal from the standpoints of environmental effect and implementation requirements, Alternate A must be the selected plan.

MAJOR FEATURES OF THE SELECTED PLAN

General Description. The major elements of the selected system are:

1. Utilization of the existing activated sludge process facilities, with modifications, to achieve combined oxidation of organic carbon and nitrification of ammonia.
2. Addition of a secondary effluent pumping station and dual media gravity filtration system on the north bank of the Maumee River adjacent to Pond No. 2.
3. Upgrading of the existing chlorination system to provide a standby capability for breakpoint chlorination of residual ammonia concentrations in the secondary effluent.
4. Use of a filtered effluent weir and cascade structure to aerate the final effluent.
5. Conversion of Pond No. 2 to dual use for impounding chlorinated secondary effluent or partially treated Stormwater Facility effluents and continuation of the capability to use Pond No. 3 as a dual-use facility.
6. Continued use of the headworks, primary clarifiers, anaerobic digesters, and other existing systems for their normal functions.

Figure V/1 gives a schematic process flow diagram for the system and Figure V/2 presents the preliminary site plant for the north bank facilities.

Estimated Costs. The estimated costs for the recommended system are shown in Table S/1.

TABLE S/1

ESTIMATED COST OF RECOMMENDED FACILITIES

	Estimated Cost
PHASE A - AERATION PROCESS EFFICIENCY UPGRADING	
Blower No. 5 Installation	$ 921,000
Aeration Diffusers Efficiency Improvements	250,000
Return Sludge Efficiency Improvements	100,000
Terminal Pond Effluent Reaeration	80,000
Pond Dredging Pumping System	410,000
Process Control System	157,000
Total Phase A Improvements	$1,918,000
PHASE B - FULL SCALE NITRIFICATION TO 60 MGD	
Blower No. 6 Installation	$ 828,500
Chlorination System	75,000
Return Sludge Pumping Changes	120,000
Total Phase B Improvements	$1,023,500

PHASE C - EFFLUENT POLISHING TO 60 MGD

Secondary Effluent Pumping Station	$1,174,500
Dual Media Gravity Filters	7,630,000
Backwash Dirty Water Tank	300,000
Effluent Reaeration and Outfall	140,000
Flood Protection Levee and Site Work	640,000
Process Control System	900,000
Electrical Work	1,725,000
Total Phase C Improvements	$12,509,000

ESTIMATED INCREASE IN ANNUAL OPERATING AND MAINTENANCE COSTS

Annual Increase in Operating and Maintenance Cost	$1,234,000

CHAPTER I

INTRODUCTION

PURPOSE AND SCOPE

This report is a continuation of the wastewater collection and treatment planning process for the City of Fort Wayne, Indiana. A Facilities Plan for Wastewater Treatment was prepared in November, 1973, and revised in January, 1974. That plan proposed the use of terminal ponds for the dual purposes of providing treatment plant effluent polishing and ammonia nitrogen removal and additional combined sewer overflow treatment in conjunction with the expansion of the existing activiated sludge secondary treatment plant.

At that time it was known that the Fort Wayne Water Pollution Control Plant soon would be required to provide a higher degree of treatment than was possible with the activated sludge process alone, but the exact final effluent limitations had not been established. There was considerable discussion among the regulatory agencies, the City staff, and the consulting engineers concerning the probable final limitations and the potential feasibility of terminal ponds for treatment plant effluent polishing.

It was decided that the provision of effluent polishing and ammonia removal facilities required further, more detailed study. Accordingly, the original Facilities Plan was amended and refiled in April, 1974. That amended plan retained the concept of constructing the ponds for combined sewer overflow treatment but deferred the issue of effluent polishing pending completion of the additional studies. The work proposed in the original Facilities Plan, as amended, is now under construction (EPA Project No. C 180538).

In the same month a Plan of Study and Step 1 grant application were submitted for the Advanced Waste Treatment Project (i.e., effluent polishing and ammonia nitrogen removal). Additional information concerning the Plan of Study was submitted in June, 1974, and a grant was offered and accepted in July, 1974. The studies have now been completed. This Facilities Plan Amendment reports the findings, conclusions, and recommendations for advanced waste treatment at Fort Wayne.

To avoid needless repetition of basic data and information, this report makes reference to the original Facilities Plan and the earlier amendment thereto wherever possible without detracting from clarity of the current work.

PLANNING AREA

The planning area is the projected 1990 service area for the Fort Wayne wastewater collection and treatment system as shown in Figure III/2 of the original Facilities Plan.

PLANNING ENTITIES

This study has been conducted by the City of Fort Wayne, through its Board of Public Works, and Henry B. Steeg & Associates, A Division of Howard Needles Tammen & Bergendoff, consulting engineers.

The study will be coordinated with and reviewed by the Allen County Plan Commission and the Northeastern Indiana Regional Coordinating Council.

EFFLUENT LIMITATIONS

The effluent quality requirements for the Fort Wayne Water Pollution Control Plant are established by its National Pollutant Discharge Elimination System (NPDES) Permit. The limitations set forth therein are derived, in part, from the Waste Load Allocation Study for the Maumee River which was published in draft form in August, 1974.

A discharge permit was issued to the City of Fort Wayne on December 30, 1974 which established the interim and final effluent limitations for the Water Pollution Control Plant. The section of the permit dealing with the effluent limitations and compliance schedule for AWT and Ammonia Removal provided the impetus to amend the previously approved Facility Plan to include ammonia removal and effluent polishing for BOD_5 and suspended solids removal. Table I/1 describes the agreed upon effluent limitations under the present NPDES Permit. The complete text of the present NPDES permit, as modified, is contained in Appendix A to this report.

TABLE I/1

FINAL NPDES PERMIT EFFLUENT LIMITATIONS
SUMMER EFFLUENT CONCENTRATION LIMITATIONS
FOR THE PERIOD JUNE 1 THROUGH AUGUST 31

Parameter	Monthly	Weekly	Daily
Biochemical Oxygen Demand (BOD_5)	10 mg/1	15 mg/1	--
Ammonia Nitrogen (NH_4^+-N)	--	--	1.3 mg/1
Dissolved Oxygen (DO)	--	--	7.0
Suspended Solids (SS)	10 mg/1	15 mg/1	--
pH	--	--	pH6 to pH9
Fecal Coliform	200 per 100 ml*	400 per 100 ml*	--
Residual Chlorine	--	--	1.0 mg/1

WINTER EFFLUENT CONCENTRATION LIMITATIONS
FOR THE PERIOD SEPT. 1 TO MAY 31

Biochemical Oxygen Demand (BOD_5)	10 mg/1	15 mg/1	--
Ammonia Nitrogen (NH_4^+-N)	--	--	2.5 mg/1
Dissolved Oxygen (DO)	--	--	7.0 mg/1
Suspended Solids (SS)	10 mg/1	15 mg/1	--
pH	--	--	pH6 to pH9
Fecal Coliform	200 per 100 ml*	400 per 100 ml*	--
Residual Chlorine	--	--	1.0 mg/1

* Geometric mean values for this parameter.

Realizing that the dates of compliance contained in the NPDES permit were beyond the realm of possibility in the time allotted, the City authorized the preparation of a report on the feasibility of implementing the selected plan as proposed by phases. This report, listed in this document as Appendix C, recommended, among other conclusions, that the present NPDES permit be modified in its entirety.

After a protracted period of negotiations with the permit issuing authority, the final effluent limitations were established for the Water Pollution Control Plant. (Refer to Table I/1). A plan for determining treatment process alternatives was formulated. Selection of the treatment process alternatives considered the range of effluent limitations established in the Plant's original NPDES permit. Of the six alternate effluent limitations contained in the original NPDES permit, the selected process alternative contained herein is based on a balance of initial capital expenditures and recurring operating costs.

The original NPDES permit effluent limits were determined to meet the Water Quality Standards of the State of Indiana by the Indiana Stream Pollution Control Board. These water quality standards were intended to be met by January 1, 1979 in this permit. The selection of the treatment process alternative was also conceived with the expectation in mind of complying with these water quality standards by this date.

An implementation schedule was proposed to begin treatment for ammonia nitrogen removal at the earliest possible date (Phase A) to an average daily flow of 42 MGD. Expansion of ammonia removal capability to 60

MGD (Phase B) and the construction of effluent polishing, reaeration, dechlorination and pH control facilities (Phase C) are proposed to be implemented simultaneously. Interim effluent limitations were proposed after the completion of Phase A to operate the plant using various combinations of single-stage nitrification, breakpoint chlorination, effluent blending and/or effluent reaeration to saturation dissolved oxygen to meet the Water Quality Standards of the State of Indiana under the "worst-case" conditions. These conditions would be effective until the construction for Phase B and C are complete.

CHAPTER II

CURRENT SITUATION

CONDITIONS IN THE PLANNING AREA

A description of the planning area and a discussion of its significant characteristics are presented in Chapters II and III of the original Facilities Plan.

EXISTING WASTEWATER COLLECTION AND TREATMENT FACILITIES

Chapter III of the original Facilities Plan provides a general description of all existing wastewater collection and treatment facilities in the planning area. Much of that material is repeated here, however, for ease of reference for subsequent sections of this report.

Existing Sewer System

The City is served by combined sewers in the older areas (12,000 acres) and by separate sanitary and storm sewers in the more recently developed areas. Several areas surrounding the City are served by private sewer systems with master meters connected to the Fort Wayne system for treatment. These areas are:

1. Clearwater Utilities, Inc. - Cooke Road (480 acres north of the City);
2. Allen County Home Complex (235 acres northwest of the City; and
3. Diversified Utilities.

In addition to the above three areas, Diversified Utilities has two connections (Aboite and Maysville Road) to the Fort Wayne system through master meters. These two connections were originally provided on a standby basis, with Diversified Utilities providing treatment under normal conditions. Currently, a portion of the flow from these two areas is received on a fairly regular basis.

The City of Fort Wayne maintains approximately 720 miles of sewers. The system includes pipes ranging in size from 8 inches to 126 inches in diameter.

The City has completed and submitted an Infiltration/Inflow Analysis and is now performing a Sewer System Evaluation Survey (EPA Project No. C180775). The report of the I/I Analysis, a separate self-contained element of the facilities planning process, presents more detailed information on the City's sewer system.

Existing Wastewater Treatment Facilities

A major expansion of the Fort Wayne Water Pollution Control Plant is currently under construction (Project No. C180538). Unless specifically noted otherwise, references herein to "existing facilities" pertain to the plant as it will exist upon completion of the current construction project.

The Water Pollution Control Plant is a 60 MGD treatment facility employing primary clarification, conventional activated sludge secondary treatment, chlorination, and two terminal ponds which are operated as interim advanced waste treatment facilities and for overflow and bypass treatment. Phosphorus is removed by the addition of alum or ferric chloride to the primary effluent. Sludges are stabilized by anaerobic digestion and dewatered in a lagoon system.

The primary and secondary treatment, phosphorus removal, and digestion facilities are located along the south bank of the Maumee River, and the chlorine contact tank and terminal ponds are on the north bank. The chlorine storage and injection equipment are housed on the south side. Chlorinated secondary effluent crosses the river to the contact tank in a 72-inch reinforced concrete pipe. A treatment facility for storm-caused bypasses and overflows is also located on the north bank. This facility is comprised of a pumping, screening, and chlorination station and a terminal pond. The presently existing storm water detention pond is identified as Pond No. 1 and those now under construction are identified as Ponds No. 2 and 3.

The digested sludge lagoons are located along the north bank, some two miles downstream of the treatment plant. This is also the site of several lagoons employed to dewater waste lime sludge from the municipal water treatment plant. A transfer line allows a portion of this waste lime sludge to be diverted to the primary effluent channels at the Water Pollution Control Plant where it is occasionally used to control bulking sludge in the secondary system.

The pertinent design criteria for the existing facilities are summarized in Table II/1, and the wastewater characteristics are presented in Table II/2.

The primary and secondary treatment facilities have been constructed so that, in effect, there are two parallel plants. For the purposes of this report, these have been designated as the East Plant and the West Plant, based upon the location of the aeration tanks and secondary clarifiers. Flow is divided in the ratio of 0.467Q to the East Plant and 0.533Q to the West Plant, so that at design flow the respective capacities are 28 MGD and 32 MGD. The East Plant secondary treatment facilities are those which are now under construction.

TABLE II/1

EXISTING WASTEWATER TREATMENT FACILITIES

Component	Design Data	
Raw Sewage Pumps	4 @ 17.5 MGD 1 @ 20.0 MGD	
	East	West
Primary Clarifiers	14,700 ft^2	16,800 ft^2
Aeration Tanks	6.912 MG	10.920 MG
Air Supply (Total)	47,500 CFM	54,500 CFM
Secondary Clarifiers	45,200 ft^2	47,500 ft^2
Return Sludge Rate	2.6-12.8 MGD	3.3-16.0 MGD
Chemical Addition (Max.)	470 lb/hr Fe(III) or 315 lb/hr Al(III)	
Chlorine Addition (Max.)	34,000 lb/day 56,000 lb/day (future)	
Chlorine Contact	River Crossing: 270,000 Gal. Contact Tank: 613,000 Gal.	
Pond No. 2	5' Depth: 33 ac, 53.3 MG	
Pond No. 3	5' Depth: 42 ac, 69.0 MG	
Anaerobic Digesters	1,032,000 ft^3	
Sludge Lagoons (Total)	239 ac	

TABLE II/2

AVERAGE WASTEWATER CHARACTERISTICS

Item	Value
Raw Sewage	
BOD_5	185 mg/1
SS	200 mg/1
TKN	32 mg/1
NH_3-N	21 mg/1
Alkalinity (M.O.)	290 mg/1
pH	7.6
Primary Effluent	
BOD_5	140 mg/1
SS	120 mg/1
TKN	28 mg/1
NH_3-N	21 mg/1
Alkalinity (M.O.)	280 mg/1
pH	7.5
Temperature	8 - 24°C

Performance of Existing Plant

The Fort Wayne Water Pollution Control Plant is a well operated and maintained facility, and routinely produces an effluent of excellent quality. The typical final effluent analysis shows approximately 15 mg/1 each of BOD_5 and suspended solids, less than 1 mg/1 total phosphorus, and 2 to 4 mg/1 dissolved oxygen. Effluent ammonia nitrogen varies widely, generally falling within the range of 4 to 15 mg/1, and averaging about 10 mg/1.

The effluent quality normally meets the requirements of the interim NPDES Permit limitations which are now in force. Additional treatment will be required, however, to enable the plant to meet the final standards summarized in Table I/1, preceding.

CHAPTER III

FUTURE SITUATION

COORDINATION WITH PREVIOUS STUDIES AND CONCLUSIONS

As related in greater detail in Chapter I, the advanced waste treatment facilities originally were to have been included in the plant expansion and upgrading project now under construction, but this element of the overall waste treatment improvement program was delayed for additional study. Since relatively little time has elapsed since the original Facility Plan work was done, it does not seem necessary to reinvestigate the required hydraulic capacity. It is proposed that the advanced waste treatment facilities be made equivalent to the rest of the plant in hydraulic process capacity, i.e., capable of treating an average daily flow of 60 MGD.

Discussions of the land use, population, and flow projections leading to the determination of the 60 MGD capacity requirement are presented in the original Facilities Plan, the Master Plan for Wastewater Treatment, Part Three, January, 1972, and the Supplement to the Master Plan, dated May 17, 1972.

PLANNING PERIOD

The previous studies noted above concluded that the hydraulic capacity requirement will reach 60 MGD in 1990 or soon thereafter. This implies that the planning period for the advanced waste treatment facilities discussed in this report should be less than the twenty years commonly used in facilities planning. Accordingly, a fifteen year term has been used in the comparative cost analysis of the alternatives described in the following chapter.

FUTURE OF THE PLANNING AREA ENVIRONMENT WITHOUT THE PROJECT

The principal objective of the project is to improve the quality of the downstream waters, the Maumee River and Lake Erie. If the project is not constructed, the Water Pollution Control Plant final effluent will not meet all of the requirements of the NPDES Permit and this objective will not be realized. Unless there were to be a relaxation of the waste load allocation for the river and the Permit conditions derived therefrom, failure to meet the discharge standards could lead to the imposition of growth limitations, and/or penalties and litigation.

The location proposed for these facilities is already owned by the City and reserved for wastewater treatment use, so that a decision not to proceed with the project would not free any land for other uses. There would be a slight reduction in the total future energy consumption in the planning area, but not of significant proportion.

From an economic viewpoint, the costs borne by the system users for debt retirement and plant operation would be somewhat lower if the project is not constructed.

CHAPTER IV

DEVELOPMENT AND EVALUATION OF ALTERNATIVES

INITIAL CONSIDERATIONS

Thorough and comprehensive consideration of all the alternatives potentially applicable to the achievement of improved water quality downstream from Fort Wayne must include examination of concepts other than classical waste treatment and discharge. These "non-treatment" alternatives have been investigated in depth in the course of previous master planning and facilities planning studies. The conclusions reached in those studies have been reviewed to assure their continued validity, and are summarized in the following paragraphs.

The "No Action" Alternative

The predicted results of a decision not to proceed with the project are summarized in the previous chapter of this report. This alternative cannot be considered viable so long as the City's NPDES Permit requires the Water Pollution Control Plant to meet the effluent limitations set forth in Table I/1. Although it should be noted that the waste load allocations for the Maumee River, which underlie the Permit limitations, have not been finalized, it is improbable that the preliminary allocations will be relaxed to the point of rendering the effluent from the existing facilities totally acceptable for discharge to the river.

Flow and Waste Reduction and Water Reuse

These subjects are discussed in Chapter VI-B and VI-D of the original Facilities Plan. To reiterate briefly, the principal flow reduction measure contemplated is the reduction of the clear water component of the total flow which will result from the sewer system investigation and rehabilitation program. Some degree of water reuse, primarily for non-potable industrial water needs, is desirable but will not impact significantly on wastewater treatment requirements. The facilities now under construction and those recommended herein will improve the effluent quality and its potential applicability for reuse. None of these facilities will preclude future reuse.

Regional Considerations

The potential regionalization of wastewater management, collection, and treatment systems was addressed in the determination of future service area for the proposed facilities and is discussed at length in the previously cited Master Plan and Facilities Plan.

Conclusions

For the designated planning period, a need will exist for a 60 MGD waste treatment facility at the location of the existing Water Pollution Control Plant on Dwenger Avenue. The process capability of the existing facilities will have to be augmented to allow the plant to produce an effluent conforming to the limitations stipulated in its NPDES Permit.

DEVELOPMENT OF WASTEWATER TREATMENT ALTERNATIVES

General

Reduction of the final effluent ammonia nitrogen to 1.3 mg/l in summer and 2.5 mg/l in winter presents the chief problem for the alternative selection process. The technology for ammonia removal from wastewater is not yet well developed. Although substantial theoretical and practical application work has been done and much has been written, at the outset of this study, no process selection could be identified as the clear and obvious cost-effective solution for the specific application at Fort Wayne.

It should be recognized that the relationship between BOD_5 and ammonia nitrogen is predictable. As BOD_5 increases, ammonia nitrogen must decrease to maintain a steady-state dissolved oxygen level to meet the final effluent limits of the NPDES Permit, and operational decisions must be made at the Plant with respect to the process operational point. In orther words, the performance requirement for any BOD_5 removal process will be significantly affected by the expected performance of the ammonia nitrogen control process coupled with it, and vice versa. This condition served to multiply the total number of alternative process combinations to be evaluated.

The physical arrangement of the existing plant presents some constraint in process selection. The available space for additional treatment units on the south side of the river is severely limited, and major flow distribution problems will be encountered with any attempt to add new facilities. In the design of the pond system on the north side, however, an area at the southwest corner of Pond No. 2 near the chlorine contact tank was reserved for the construction of future advanced waste treatment facilities.

Preliminary Screening of Alternate Treatment Processes

The individual treatment processes which were given preliminary evaluation were selected after an extensive review of the technical literature and with consideration of the findings of previous pilot studies, such as that done at Indianapolis and others reported in various EPA publications. The several processes which were evaluated are summarized in Table IV/1.

TABLE IV/1

INDIVIDUAL TREATMENT PROCESSES CONSIDERED

No.	Loc.*	Unit Process	Potential Application**				
			BOD	NH_3	SS	DO	Coli
1	S	Single-Stage Activated Sludge	1	1	2	-	-
2	N	Air Activated Sludge Nitrification	2	1	2	-	-
3	N	Oxygen Act. Sludge Nitrification	2	1	2	-	-
4	N	Rotating Biological Contactor (RBC) Nitrification	2	1	2	-	-
5	N	Trickling Filter (TF) Nitrification	2	1	2	-	-
6	S	RBC Carbonaceous Roughing	1	-	-	-	-
7	S	TF Carbonaceous Roughing	1	-	-	-	-
8	N	Breakpoint Chlorination-Full Load	-	1	-	-	1
9	N	Breakpoint Chlorination-Polish	-	1	-	-	1
10	N	Ammonia Ion Exchange	-	1	-	-	-
11	S,O	Digester Supernatant Treatment	2	1	-	-	-
12	N	Gravity Filtration	2	-	1	-	-
13	N	Aerated Pond(s)	1	-	-	1	-
14	N	Facultative Pond(s)	1	-	1	-	-
15	N	Effluent Weir and Cascade	-	-	-	1	-
16	N	Effluent Diffused Aeration	-	-	-	1	-
17	N	Hydrogen Peroxide Addition	-	-	-	1	2
18	N	Ozonation	1	-	-	1	1
19	N,O	Land Application	1	1	1	1	-
20	N	Activated Carbon Adsorption	1	-	2	-	-
21	N	Chemical Coagulation and Clarif.	2	-	1	-	-

* Location: S-south bank, N-north bank, O-other

** 1-principal application, 2-secondary application

There are literally hundreds of combinations of these processes in conjunction with existing facilities which are potentially applicable at Fort Wayne. A rapid preliminary screening evaluation was made, therefore, to reduce the number of possibilities to be given further consideration. This screening eliminated the following processes for the reasons stated:

1. Full load breakpoint chlorination (No. 8 in Table IV/1); over $4,000,000 per year in operating cost alone.
2. Ammonia ion exchange (No. 10); $20,000,000 to $25,000,000 capital cost and $1,500,000 to $2,000,000 annual operating cost.
3. Hydrogen peroxide addition for effluent oxygenation (No. 17); over $800,000 annual operating cost.
4. Land application of secondary effluent (No. 19); over $50,000,000 in capital cost and adverse environmental impact.
5. Activated carbon adsorption (No. 20); would provide a degree of treatment not warranted by the effluent standards, particularly since preceding gravity filtration probably would also be required for its proper operation.
6. Chemical coagulation and clarification (No. 21); higher total cost than filtration and poorer effluent quality and reliability.

The fifteen surviving alternative processes were then given a more detailed comparative analysis to further reduce the list to those most feasible for Fort Wayne.

The following paragraphs present a brief discussion of each of the remaining potential treatment processes.

Single-Stage Activated Sludge (No. 1 in Table IV/1). At the initiation of the study, it appeared quite probable that the existing facilities would be capable of achieving substantial, if not complete, nitrification (conversion of ammonia to nitrate) in the activated sludge secondary treatment system. The available data and preliminary calculations indicated that it would be possible to operate the existing system at very low carbonaceous and ammonia process loadings. The available data from other studies indicate that such loadings should yield complete nitrification. However, a review of the operating records at Fort Wayne showed only inconclusive nitrification performance data for past operation under generally similar low loadings. Other unknowns for this process concept were whether or not the existing return sludge and air supply capabilities would be adequate, the maximum clarifier loading allowable to prevent loss of the nitrifiers, the quantity of waste sludge which would be generated, and the minimum allowable operating sludge age.

Suspended Growth Second Stage Nitrification (No. 2 and 3). These systems would receive the effluent from the existing activated sludge secondary treatment facilities. The physical facilities would resemble the existing activated sludge system (aeration tanks, clarifiers, and return sludge system), and would be designed and operated to achieve the biological oxidation of ammonia to nitrate (nitrification).

Fixed Film Second Stage Nitrification (No. 4 and 5). These systems would employ rotating biological contactors or artificial media trickling filters and would be designed and operated to achieve nitrification of the effluent from the existing activated sludge secondary treatment facilities.

It has been noted in other studies that these systems may not respond well to rapid changes in ammonia loading with the result that effluent quality may deteriorate until the biomass adjusts to the new loading. However, presuming that the "worst" secondary effluent can be kept relatively low in ammonia concentration, the results of the Peoria, Illinois, pilot study of rotating biological contactors following activated sludge are of interest. The system achieved successful nitrification of a secondary effluent with 4 to 6 mg/l NH_4^+-N. It is probable, although not definite, that the nitrified effluent could go to subsequent treatment, such as ponding followed by filtration, without sedimentation.

Fixed Film Carbonaceous Roughing (No. 6 and 7). These systems would involve inserting rotating biological contactors or trickling filters ahead of the existing activated sludge facilities for high rate loading with primary effluent. This is the process configuration selected after pilot study for the Indianapolis plants. The only feasible way to do this at Fort Wayne, however, would be to construct the roughing system above the existing aeration tanks in a "two-story" arrangement. This would be very expensive construction and would create a difficult hydraulic problem in intercepting the two primary effluent channels for pumping to the roughing system. Determination of the minimum roughing required to allow complete nitrification in the second stage would be very important to minimize the cost.

Breakpoint Chlorination for Ammonia Polishing (No. 9). This concept has potential application for removing small amounts of ammonia if, for instance, the single-stage nitrification process came close to meeting the effluent requirement but did not quite reach it.

Digester Supernatant Treatment (No. 11). This concept appeared quite promising as an adjunct process with any of the other possibilities. Mass balance estimates indicate that as much as 15 to 25 percent of the total ammonia load in the plant is in the digester supernatant returning to the raw sewage wet well. Since this stream accounts for only about one percent or less of the total flow, the potential for relatively significant ammonia removal is clear. Work done by the Chicago Metropolitan Sanitary District concluded that rotating biological contactors can achieve 90 percent or greater nitrification of anaerobic supernatants.

Gravity Filtration (No. 12). This is a well established process for polishing secondary effluent suspended solids and needs little explanation. The only significant question pertinent to this report is the determination of the maximum allowable average hydraulic loading rate. This would be a function of the diurnal flow variation and the nature of the solids discharging from whatever process precedes the filters.

Terminal Ponds (No. 13 and 14). The ponds, either facultative as they exist or upgraded with facilities such as aeration, pH control, polymer addition, or effluent recycle, presented a significant and somewhat controversial question; specifically, can they achieve adequate suspended solids and BOD removal to meet the final NPDES criteria and thus save the cost of filters? The early operating data for Pond No. 1 before it received bypasses and overflows indicates that the ponds can, in fact, produce an effluent with less than 10 mg/1 BOD and SS. However, these early operating data did not include steady-state operations during the crucial summer months.

Effluent Reaeration (No. 15 and 16). As presently designed, the ponds provide a weir and cascade aeration type discharge. A determination of the exact reaeration capacity of the system has not yet been made. If the system does not provide a suitable effluent DO it will have to be augmented with a small diffused air system. Should the ponds be taken out of the wastewater treatment process sequence, a new effluent aeration system of the cascade or diffused air type will be necessary.

Ozonation (No. 18). An ozonation system for effluent disinfection and oxygenation would be feasible only if an oxygen activated sludge system were chosen for nitrification. Even in that case, the economics do not seem to favor the ozone system.

Cost Comparisons and Discussion. The following cost comparisons were made for the purpose of determining which systems warranted further study for final evaluation. These estimates were made from rough preliminary design data, and maximum use was made of the various process cost curves published by EPA and others. Present worth values were calculated using a twenty year term and a seven percent interest rate.

These preliminary estimates were originally reported in Interim Report No. 1, July, 1975, for the Advanced Waste Treatment Study. Recent review of these estimates indicates that they are low. They are generally uniformly low, however, and therefore serve adequately for preliminary process cost comparisons.

Review of Table IV/2 shows clearly that the single-stage activated sludge process is the least cost solution for ammonia-nitrogen control if the existing system can be operated to achieve reliable and satisfactory nitrification.

The various two-stage biological process concepts which involve new second stage facilities (Nos. 2 through 5) are roughly comparable in cost if the fixed film systems can be rather heavily loaded. The fixed-film roughing systems (Nos. 6 and 7) are also comparable in cost except at the highest anticipated loadings where they become slightly favored over the other two-stage processes. As stated previously, though, the space constraints on the south side of the river would require these facilities to be constructed over the existing aeration tanks. There is also a major question whether it is practically feasible to resolve the flow distribution problem without creating an operator's nightmare.

The nitrification of digester or lagoon supernatant on RBC units appears to offer an advantageous method of reducing the ammonia load on any of the other processes and may find application coupled with any of the other alternatives.

The preliminary cost comparison of gravity filters versus ponds for the removal of residual suspended solids and BOD_5 favors the ponds by a substantial margin. As with the single-stage nitrification concept, however, the unknown factor is whether or not the existing facilities, i.e., the ponds, can be relied upon to produce a satisfactory effluent consistently.

TABLE IV/2

PRELIMINARY ESTIMATES FOR INDIVIDUAL TREATMENT PROCESS COSTS

Process	Capital Cost ($1,000's)	Annual O & M Cost ($1,000's)	Present Worth ($1,000's)
1. Single-Stage Activated Sludge	$ 450	$ 75	$ 1,250
2. Air Activated Sludge Nitrification			
a. 2-hr. Aeration	7,500	185	9,460
b. 4-hr. Aeration	9,650	200	11,770
3. Oxygen Activated Sludge Nitrification			
(2-hr. Aeration)	8,500	210	10,720
4. RBC Nitrification			
a. 1.5 gpd/ft^2	20,400	420	24,850
b. 2.5 gpd/ft^2	13,000	300	16,000
c. 4.0 gpd/ft^2	8,250	210	10,470
5. TF Nitrification			
a. 0.5 gpm/ft^2	17,000	240	19,540
b. 1.5 gpm/ft^2	7,750	160	9,450
6. RBC Roughing			
a. 4 gpd/ft^2	11,000	250	13,650
b. 6 gpd/ft^2	8,500	210	10,720
c. 8 gpd/ft^2	6,850	185	8,810
7. TF Roughing			
a. 2 gpm/ft^2	7,500	175	9,360
b. 4 gpm/ft^2	5,500	145	7,040
9. Breakpoint Polishing			
a. for 1 mg/1 NH_4^+-N	100	390	4,230
b. for 2 mg/1 NH_4^+-N	100	750	8,050
11. Supernatant Nitrification			
a. 2 lbs/day/1,000 ft^2	720	20	930
b. 1 lb /day/1,000 ft^2	1,400	40	1,820

TABLE IV/2 - Continued

Process	Capital Cost ($1,000's)	Annual O & M Cost ($1,000's)	Present Worth ($1,000's)
12. Gravity Filtration			
a. 3.0 gpm/ft^2	$ 5,450	$ 270	$ 8,310
b. 3.5 gpm/ft^2	4,800	250	7,450
13. Pond Upgrading (one only)			
a. Aeration	500	100	1,560
b. Polymer Addition	50	200	2,170
c. Effluent Recycle	1,000	60	1,640
16. Effluent Diffused Aeration			
a. Δ DO = 3 mg/l	75	20	285
b. Δ DO = 6 mg/l	100	30	420
18. Ozonation			
a. ω/O_2 system for nitrif.	2,750	316	6,170
b. ω/air	3,400	580	9,540

At this point in the study, it was recognized that the available information was insufficient to permit the confident selection of the apparent least-cost alternatives. An extensive testing program was undertaken, therefore, to obtain the data necessary for a rational final process selection.

Prototype and Pilot Scale Process Studies

General. Detailed studies of two pilot-scale systems and two full-scale prototype operations were conducted at the Water Pollution Control Plant during the period of October, 1975 to April, 1976. The systems studied were (a) a pilot-scale single stage activated sludge nitrification process, (b) a prototype single stage nitrification process employing a portion of the existing full-scale activated sludge facilities, (c) a prototype pond operation employing the recently constructed Pond No. 3, and (d) a pilot-scale rotating biological contactor for anaerobic supernatant nitrification.

Interim reports describing the plans, progress, and preliminary findings of these studies were submitted in July and October of 1975, and February, 1976. The detailed final report of the testing program is included as Appendix B of this report. A summary of the objectives and conclusions of that program is presented in the following paragraphs.

Objectives. The principal objective of this testing program was to resolve the following questions:

1. Can the existing activated sludge process units be operated to provide both carbon oxidation and nitrification of ammonia, and, if so, what structural or equipment modifications will be required to provide this capability at the design rate of 60 MGD?

2. Can the existing terminal ponds, as they exist or with modifications, be made to provide adequate tertiary treatment in conjunction with a nitrification process to meet the final NPDES Permit effluent limitations?
3. Can the anaerobic digestion supernatant be successfully nitrified on a rotating biological contactor, and is such treatment necessary to assure satisfactory overall ammonia-nitrogen control?

As implied by the cost estimates in Table IV/2, the potential savings to be realized if either single stage nitrification or terminal pond tertiary treatment, or both, could be demonstrated to be feasible amounted to several million dollars.

Conclusions. The major conclusions derived from the testing program are as follows:

1. The single stage activated sludge nitrification process is feasible for use at Fort Wayne. At the design condition of 60 MGD the process will require more air than is currently available, making it necessary to provide additional blower capacity. Operating costs make it necessary to consider upgrading the aeration process efficiency to reduce the costs of operation in nitrification. It appears that the existing return sludge pumping capacity will have to be increased. Some modification of the existing secondary settling tanks will be required. The practice of returning the terminal pond

dredgings to the Water Pollution Control Plant must be discontinued because these dredgings were demonstrated to adversely affect the treatment plant process. Alternate disposal of the terminal pond dredgings at the sludge lagoons is advisable.

The process will require very close operating attention, particularly as the applied load approaches the plant design capacity. Due to the sensitivity of the nitrifying biological culture to changes in operating conditions, diligent monitoring and control of the process will be necessary to maintain continuously satisfactory treatment.

The prototype operating results exhibited periodic instability and a tendency toward process upset by rather abrupt changes in process loading or operating conditions. It is highly improbable that even the best operation can anticipate these process upset conditions, given the nature of municipal wastewater treatment. Since the NPDES Permit does not allow any substantial or extended deviation from the effluent ammonia-nitrogen limitations, it is considered prudent to provide an auxiliary system to reduce the secondary treatment process effluent ammonia on an "as required" basis. The breakpoint chlorination process is considered most feasible for this purpose. The terminal pond can be utilized as an ammonia nitrogen concentration equalization basin and effluent dechlorination facility in operation of the treatment plant.

2. Terminal ponds have not been demonstrated to be able to meet the final effluent limitations when used as the sole advanced waste treatment process in conjunction with single stage nitrification at the full design load. The single stage process effluent suspended solids concentrations were too great to be fully confident of reliable reduction to less than 10 mg/l by ponds on a continuous, steady-state basis. It was concluded that a more positive, controllable process should follow single stage nitrification for removal of residual BOD_5 and suspended solids.

   Analysis of dry weather period data for Pond No. 1 since it went into service in October, 1972, and extensive review of reported pond performance at other locations indicates that a one or two pond system may provide satisfactory final treatment following a stable nitrification process. This process arrangement has not previously been reported in the literature and its operational feasibility cannot be documented. Moreover, review of Pond No.1 effluent data reveals that the effluent quality in June, July and August is normally poorer than the annual average value. This is significant in that the NPDES Permit limitations are stricter during these summer months than in the balance of the year, and the potential for water quality degradation is somewhat greater in this period due to low flow conditions in the river.

3. The nitrification of anaerobic digester supernatant with rotating biological contactors appears to be a feasible process. This conclusion is drawn primarily from the results reported by the Chicago Metropolitan Sanitary District. The pilot-scale unit at Fort Wayne provided little data indicating the practicality of treatment of anaerobically digested sludge supernatant because the supernatant treated in the pilot study was found to be heavily laden with sludge solids. Furthermore, any facility to separately treat digester supernatant must of necessity be located at the sludge lagoon location. This requires a treatment facility at a remote location. This situation is not cost-effective when compared to single stage nitrification at the Water Pollution Control Plant. In any case, this treatment should not be necessary to meet the final effluent limitations, and it will not be proposed for inclusion with this project. The process may find application in the future to reduce the recycled loading on the single stage nitrification process at the design condition.

Process Alternatives Selected for Final Evaluation

On the basis of the testing program results as well as the conclusions of the literature reviews and "desk studies" which were continued during the testing period, the following determinations have been made:

1. The terminal ponds will not be recommended for routine use as advanced waste treatment facilities. Pond No. 3, however, will be interconnected with the principal advanced waste treatment system for alternate, parallel, or series use.
2. The fixed film carbonaceous roughing systems (Nos. 6 and 7 in Tables IV/1 and IV/2) are not practicable for the Fort Wayne plant due both to severe space and flow distribution constraints and cost.
3. The nitrification of anaerobic digestion supernatant is technically feasible, but, since a clear need for the process has not been demonstrated, it is not recommended for this project.
4. Second stage activated sludge nitrification employing a high purity oxygen system does not appear to offer any cost advantage to offset the disadvantage of increased equipment complexity and is, therefore, dropped from further consideration.
5. The use of ozone for effluent disinfection and oxygenation is not cost-competitive with continued chlorination. An ozonation system would also be somewhat of a duplication of processes since a chlorine system will be required in any event to provide a standby breakpoint chlorination capability.
6. The diffused and mechanical aeration systems considered for effluent reaeration would require the construction of aeration facilities on the north side of the river, substantially increasing the costs of effluent reaeration. Furthermore, it appears that an effluent cascade can be incorporated into a filter

structure without great difficulty. As an interim effluent reaeration measure, a submerged diffused air header will provide the effective D.O. reaeration required in the NPDES Permit.

With the elimination of the processes noted above, the remaining candidates are:

For oxidation of organic carbon and ammonia nitrification

1. Single stage biological treatment employing the existing activated sludge process facilities with equipment and operational modifications.
2. Two stage biological treatment employing the existing activated sludge system followed by a suspended growth, cell recycle (activated sludge type) nitrification process on the north side of the river.
3. Two stage biological treatment employment the existing activated sludge system followed by a fixed film (trickling filter type) nitrification process on the north side of the river.

For auxiliary ammonia-nitrogen control capability

4. Breakpoint chlorination employing the existing system with equipment and distribution piping modifications.

For tertiary removal of suspended solids and BOD_5

5. Dual media gravity filtration with a new system constructed on the north side of the river, with the optional capability to use Pond No. 3 following or in lieu of filtration.

For effluent reaeration

6. An effluent weir and cascade incorporated into the filter structure.

These six processes have been combined into three advanced waste treatment process alternates for final comparative evaluation. Detailed descriptions and preliminary design information for these three alternates are presented in the following section.

EVALUATION OF ALTERNATE ADVANCED WASTE TREATMENT PROCESS COMBINATIONS

Description of Alternates

The six candidate processes identified on the previous page can be arranged into three alternate combinations, each of which features one of the three alternatives for oxidation of organic carbon and ammonia nitrification. Each of these three alternate treatment sequences would be capable of producing a final effluent quality in compliance with the criteria set forth in Chapter I.

Alternate A (Single Stage Nitrification). This Alternate proposes utilizing the existing activated sludge facilities, with modifications, to achieve nitrification. The existing return sludge pumps will be upgraded to enable them to deliver approximately 75% of the design flow rate. New blower units will be added to increase the present air supply by approximately 45,000 cfm. The capacity of the existing chlorination facilities will be expanded to 56,000 lbs/day, the maximum delivery requirement anticipated in the original design. A 60 MGD pumping facility will be built on the north side of the Maumee to feed the effluent from the existing chlorine contact tank to a new dual media filtration system. The filters will be designed for an average hydraulic loading rate of 3 GPM/ft^2 for a total filter surface area of approximately 14,000 ft^2. An effluent cascade will be incorporated into the filter structure to increase the effluent dissolved oxygen to the level required by the NPDES Permit (minimum 6.0 mg/l). The advanced waste treatment facilities on the north bank of the Maumee will be interfaced with the central process controller located in the control room of the main plant on the south side of the river. This will be provided by the addition of either a small satellite computer or a direct hardwire connection with the main central processor. The new north bank facilities will be enclosed within a new levee to protect against flooding.

Alternate B (Two Stage Nitrification - Activated Sludge). In this Alternate, secondary effluent from the existing activated sludge system will be directed to a second activated sludge plant on the north side of the Maumee River. This second stage activated sludge system will consist of 3 three-pass aeration tanks having a total volume of 1,500,000 ft^3 for a hydraulic detention time 4.5 hours at design flow. The clarifiers will be loaded at a rate of 550 GPD/ft^2 for a total surface area of 110,000 ft^2. Five 16,000 cfm blowers will be installed for a design capacity of 64,000 cfm with the largest unit out of service. The return sludge pumps will be sized to deliver a minimum of 25% and a maximum of 100% of the incoming flow. Following the second stage activated sludge nitrification system the effluent will be pumped, filtered, and aerated using the same design criteria outlined for Alternate A. The provisions for chlorination will include a new chlorine solution pipe river crossing for chlorine injection following nitrification, as well as the upgrading of the existing system as described for Alternate A. Also as noted for Alternate A, control of operations on the north side of the Maumee will be interfaced with the central processor located in the control room of the main facility on the south side of the river. A new levee will also be required for the north bank facilities for this Alternate.

Alternate C (Two Stage Nitrification - Trickling Filters). This Alternate includes the nitrification of activated sludge secondary effluent on artificial media trickling filters. An additional 60 MGD pumping facility will be required on the north side of the river to lift the secondary effluent for distribution to four 21.5 feet high trickling filter towers, each of which will contain approximately 550,000 cubic feet of media. The trickling filter effluent will then be chlorinated (requiring a new chlorine solution river crossing as in Alternate B), pumped, filtered, and aerated as described for Alternate A. As with the other Alternates, controls for the north bank facilities for this Alternate will be interfaced with the central processor located in the control room of the main plant on the south side of the river. A new levee will also be required for the north bank facilities for this Alternate.

Comparative Cost Evaluation

Cost Analysis Method. In accordance with EPA regulations for the preparation of Facilities Plans, the proposed treatment facilities must represent the most cost-effective means of meeting established effluent and water quality goals, recognizing environmental and social considerations.

The use of "cost-effective analysis" as a planning tool is intended to allow comparision of both the initial and long-term total cost of alternative solutions. The procedure allows the identification of the most cost-effective program for pollution control.

The estimated costs applied in the following analysis are based on recent bid prices for similar work, cost estimating guidelines published by EPA and others, and current quoted prices from manufacturers and suppliers.

The analysis of capital costs includes both construction and non-construction costs associated with the project. Non-construction costs include preparation of construction plans and specifications, soils testing, legal services, facility startup, legal surveys of property, land acquisition, and a contingency allowance for unforeseen expenses. As required by Federal guildelines, expenses for existing facilities, previous planning and current planning are not included in the analysis.

The estimated capital costs in Tables IV/3 through IV/6 are based on 1978 cost estimates for comparison purposes only. Table V/3 and V/4 following, reflect construction cost estimates for this work.

Operation and maintenance costs used in the analysis included labor, power, materials and supplies, chemicals, and replacement parts for mechanical equipment. The estimates of annual operation and maintenance costs are based on a flow rate of 48 MGD, considered as the mean flow rate over the planning period.

The individual treatment Alternates were compared on a present worth basis. The present worth of a project is defined as the amount of money required at the beginning of a project to totally finance the construction, operation, and maintenance over the project planning period. The present worth calculations made herein are based on an interest rate of seven percent and the fifteen-year planning period remaining on the life of the present project.

Estimated Costs of Individual Alternates and Present Worth Comparison. The following Tables IV/3, IV/4 and IV/5 present the estimated capital and annual operating costs for Alternates A, B, and C, respectively. Table IV/6 then presents the project present worth comparison of all three Alternates.

TABLE IV/3

ESTIMATED COSTS FOR ALTERNATE A

Item	Estimated Construction Cost
New Return Sludge Pumps	$ 60,000
Additional Blowers	500,000
Additional Chlorinator Capacity	75,000
Filter Pumping Station	850,000
Dual Media Filtration System	5,700,000
Post Aeration and Outfall Structures	100,000
Flood Protection Levee	430,000
Standby Power System	150,000
Process Control System	500,000
Electrical Work	1,100,000
Operation During Construction	150,000
Total Estimated Construction Cost	$ 9,615,000

	Estimated Annual O&M Cost
Labor	$ 155,000
Power	966,000
Chemicals	48,000
Maintenance Supplies and Parts	50,000
General Office Expense	15,000
	$ 1,234,000

TABLE IV/4

ESTIMATED COSTS FOR ALTERNATE B

Item	Estimated Construction Cost
Second Stage Activated Sludge Nitrification Facilities	$ 7,330,000
Filter Pumping Station	850,000
Dual Media Filtration System	5,700,000
Additional Chlorinator Capacity and River Crossing	120,000
Post Aeration and Outfall Structures	100,000
Flood Protection Levee	800,000
Standby Power System	250,000
Process Control System	750,000
Electrical Work	2,100,000
Operation During Construction	100,000
Total Estimated Construction Cost	$ 18,100,000

	Estimated Annual O&M Cost
Labor	$ 315,000
Power	1,686,000
Chemicals	95,000
Maintenance Supplies and Parts	250,000
General Office Expenses	15,000
	$ 2,361,000

TABLE IV/5

ESTIMATED COSTS FOR ALTERNATE C

Item	Estimated Construction Cost
Second Stage Trickling Filter Nitrification Facilities (excluding media)	$ 7,270,000
Trickling Filter Media	7,700,000
Filter Pumping Station	850,000
Dual Media Filtration System	5,700,000
Additional Chlorinator Capacity and River Crossing	120,000
Post Aeration and Outfall Structures	100,000
Flood Protection Levee	800,000
Standby Power System	250,000
Process Control System	750,000
Electrical Work	1,900,000
Operation During Construction	100,000
Total Estimated Construction Cost	$ 25,540,000

	Estimated Annual O&M Costs
Labor	$ 295,000
Power	450,000
Chemicals	95,000
Maintenance Supplies and Parts	275,000
General Office Expense	15,000
	$ 1,130,000

TABLE IV/6

PRESENT WORTH COMPARISONS OF ALTERNATES

Item	Alternate A	Alternate B	Alternate C
Capital Costs			
Construction Cost	$ 9,615,000	$ 18,100,000	$ 25,540,000
Non-Construction Costs	1,923,000	3,620,000	5,108,000
Total Capital Costs*	$ 11,538,000	$ 21,720,000	$ 30,648,000
Annual O&M Cost	$ 1,234,000	$ 2,361,000	$ 1,130,000
Present Worth Annual O&M Cost*	$ 11,240,000	$ 21,500,000	$ 10,300,000
Present Worth of Future Salvage Value*	$ (938,000)	$ (1,827,000)	$ (2,896,000)
Project Present Worth (sum of * items)	$ 21,840,000	$ 41,393,000	$ 38,052,000

ENVIRONMENTAL ASSESSMENT

Purpose. The National Environmental Policy Act of 1969 (NEPA) requires Federal agencies to integrate environmental considerations into any planning or decisions which may have an effect on man's environment. Section 102(2)(c) of NEPA also requires an Environmental Impact Statement on ". . . major Federal actions significantly affecting the quality of the human environment . . ." In order to ascertain whether an Environmental Impact Statement need be prepared, an environmental assessment of the proposed action and viable alternatives is formulated. The environmental assessment, in conjunction with the cost-effective analysis, comprises the major evaluation of the treatment alternates.

General Assessment. The National Pollutant Discharge Elimination System (NPDES) Permit for Fort Wayne requires that the discharge from the proposed advanced wastewater treatment facilities contain monthly average concentrations of BOD, suspended solids, and ammonia-nitrogen as outlined in Figure 1 and 2, Appendix A. In view of the effluent standards imposed by the NPDES Permit, "no-action" cannot be considered as a viable alternate to the construction of improvements.

As previously discussed, after a preliminary screening of all feasible process alternatives and guided by the conclusions of a six-month pilot study, the following advanced wastewater treatment systems were selected for final evaluation.

Alternate A - Single stage nitrification with appropriate modifications to the present activated sludge plant.

Alternate B - Nitrification of the present activated sludge effluent in a new activated sludge facility on the north side of the Maumee River.

Alternate C - Nitrification of the present activated sludge effluent on an artificial media trickling filter facility on the north side of the Maumee River.

Each Alternate includes biological nitrification capability, standby breakpoint chlorination for treating excessive ammonia nitrogen bleed-through, nitrified effluent storage and/or blending in terminal ponds, nitrified effluent pumping and dual media filtration to reduce the effluent BOD_5 and suspended solids, and final treated effluent reaeration to restore the effluent dissolved oxygen. These additional treatment steps are necessary to meet the NPDES Permit requirements under the various operational conditions.

In order to compare the environmental effects associated with the construction and operation of these Alternates, an alternate versus environmental effect matrix, Table IV/7, was developed. Within the matrix, each Alternate was briefly assessed with respect to its short and long term effect on five parameters: water quality, air quality, local biology, energy consumption, and sociological considerations. Short term effects refer to construction related activities, which are anticipated to be approximately two years in duration. Long term effects refer both to direct long range environmental effects (i.e. water quality in the receiving stream) and indirect long term effects (i.e. energy and chemical expenditures for facilities operation and maintenance). The limits of descriptive terms such as "major" and "minor" were considered

TABLE IV/7

ENVIRONMENTAL PARAMETERS AND RESPECTIVE IMPACTS

Treatment Alternates	WATER		AIR		BIOLOGY		ENERGY		SOCIOLOGICAL	
	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term
A. Single Stage Nitrification in Existing Secondary Treatment Plant	Negligible: Minimal effort needed to prevent impacts (erosion, stream siltation) stemming from construction	Improved water quality in the receiving stream (increased D.O., decreased concentrations of NH_4^+ -N and BOD_5)	Negligible	Negligible	Minor alteration of wildlife habitat	Improved aquatic habitat	Negligible	2.3 times existing secondary energy requirements	Generate employment	Promote orderly community development
B. Second Stage Nitrification-Activated Sludge Reactor	Greater erosion potential than Alt. A	Same as Alt. A	Negligible	Negligible	Same as Alt. A in slightly larger area	Same as Alt. A	Negligible	3.2 times existing secondary energy requirements	Greater employment potential	Same as Alt. A
C. Second Stage Nitrification-Fixed Film Reactor	Same as Alt. B	Same as Alt. A	Negligible	Negligible	Same as Alt. B	Same as Alt. A	Negligible	1.7 times existing secondary energy requirements	Same as Alt. B	Same as Alt. A

relative to the three evaluated Alternates.

ENVIRONMENTAL EFFECTS OF ALTERNATE WASTEWATER TREATMENT SYSTEMS

As demonstrated in more detail in the following paragraphs, the basic similarity of the three Alternates results in there being only relatively minor differences in their respective environmental effects. All three propose the use of the same site, on land already owned by the City and reserved for wastewater treatment.

Short term effects associated with plant construction activity would be comparable for the three alternates. Due to the relatively isolated location of the treatment plant, adverse environmental effects related to facilities construction (e.g. noise, dust, traffic disruption, etc.) would not be anticipated to affect residents of the City. Relatively simple precautions taken during construction of any of the three alternates, such as straw matting, wetting, and dust pallitives, would significantly curtail erosion and dust at the construction site. Alternates B and C have a greater potential for soil erosion than Alternate A.

Short term sociological considerations include the generation of construction employment and the potential for construction related nuisance conditions such as dust, noise, and localized traffic congestion. Being substantially larger projects, Alternates B and C would create more of both.

The local terrestrial ecosystem will be disrupted during construction and permanently altered within the vicinity of the new facilities. The area contains no known rare or endangered species nor is this area a part of a sensitive ecological habitat. Historical and archaelogical sites are not known to exist in the area surrounding the wastewater treatment plant. The State Historic Preservation Officer has been contacted and has suggested an archeological reconnaissance of the site. A reconnaissance will be undertaken prior to construction. All three Alternates would include the planting of trees and shrubs to blend the area with the landscaping and plantings provided around the adjacent ponds in the current construction project.

The principal long term effect of all three Alternates would be to improve the quality of the Maumee River and Lake Erie to which it discharges. Comparable degrees of enhanced water quality would be expected from all three Alternates, as most notably evidenced by increased stream dissolved oxygen concentrations, reduced BOD_5 concentrations, and reduced ammonia nitrogen values. Sufficient stream dissolved oxygen concentrations and low ammonia concentrations are important for the propagation of desirable fish populations and other aquatic life. The effect on water quality is discussed in more detail in "A Report to the City of Fort Wayne Regarding a Proposed Plan of Implementation of Ammonia Removal and Effluent Polishing at the Water Pollution Control Plant" which is included in this Facility Plan as Appendix C. None of the Alternates are expected to have any significant long term effect on the surrounding air quality. No significant odor problem is expected with any of the Alternates due to both the nature of the processes and the isolation of the site.

Alternates A, B, and C are predicted to have additional annual electrical power requirements of approximately 25, 41, and 13 million kilowatt hours, respectively. They will also require approximately 525, 120, and 120 tons per year, respectively, of additional chlorine usage which requires electrical energy at its point of manufacture. While there is substantial variation among the three Alternates, none poses a significant demand from the standpoint of the total energy requirement for the Fort Wayne area.

Long term sociological considerations would include (1) elimination of the potential imposition of growth restraints which could arise from failure of the treatment plant to meet its effluent quality requirements, (2) create a small number of permanent jobs, and (3) improve the quality of the Maumee River for water related recreation. On all three points, the Alternates under consideration are essentially equal.

All three of the Alternates propose construction within the flood plain on the northside of the Maumee River including a levee for protection against the 100-year frequency flood. Consequently, approval of plans and specifications must be obtained from the National Resource Commission.

Approval of construction in the floodway was obtained from the Indiana Department of Natural Resources for Divisions I, II, and III of Fort Wayne's current expansion project under Docket Numbers G-3609, G-2570, and G-3932, respectively. In regard to Docket No. G-2570, a joint hydraulics study was made in 1968-69 by personnel from the Indiana Department of Natural Resources and Henry B. Steeg & Associates. This study was made to determine the effects of the three proposed ponds on Maumee River flood stages. The approved construction for Division II included a levee along the north bank of the Maumee River which would provide protection to the ponds against flooding from the 100-year frequency flood. Prior to construction of the ponds, a decision was made to relocate the levee landward of the approved location in order to provide room on the northside of the river for AWT facilities, when they were required, landward of the approved levee location. By keeping all construction activities at or landward of the approved levee location, flood stages should be at or less than those determined under the approved conditions.

Adverse Impacts Which Cannot Be Avoided Should the Proposal Be Implemented

The expenditure of energy for the construction, operation and maintenance of the proposed facilities is an impact which cannot be avoided. Electricity and fossil fuels will have to be used in the construction and to maintain the proposed facilities. Short term adverse impacts related to construction and associated minimizing techniques were discussed earlier in this chapter. The physical appearance of the land will not be appreciably altered at the completion of the project and will essentially be as before construction. Some trees and grass will be removed during construction; however, landscaping and seeding prior to the project completion will reduce the adverse aesthetic impact.

Summary. None of the Alternates would create any significant adverse environmental condition and all will lead to improvement of Maumee River water quality. None of the Alternates is significantly better or worse than the others from an overall environmental viewpoint. The adverse short term construction related nuisance conditions would be somewhat less with Alternate A, since the nitrification facilities will involve internal construction within the existing facilities, whereas the nitrification facilities for Alternates B and C would involve construction of new facilities. The proposed effluent filtration facilities are identical for all Alternates and, therefore, would have identical environmental effects. Alternate C requires substantially less energy than either Alternate A or B. In all other aspects, the three Alternates are essentially similar.

Implementation Requirements

The City of Fort Wayne has the authority and capability to implement any of the three Alternates. The actions necessary to implement the project are the same for all Alternates. The major steps are:

1. Hold a public hearing on the Facilities Plan.
2. Officially adopt and submit the Facilities Plan.
3. Apply for and secure Step 2 (design) grant funds.
4. Authorize preparation of construction plans and specifications.
5. Submit plans and specifications for approval.
6. Apply for and secure Step 3 (construction) grant funds.
7. Advertise for and receive construction bids.
8. Arrange financing for local share of project costs.
9. Award contract for construction of the project.
10. Authorize preparation of an amendment of the present user charge system and Operation and Maintenance Manual.

CHAPTER V

PLAN SELECTION

VIEWS OF PUBLIC AND CONCERNED INTERESTS

A public hearing was held on January 20, 1977 to disseminate project information and receive comments from concerned parties. A detailed summary of the hearing is presented in Chapter VI and letters and comments received are contained in Appendix D.

RANKING OF ALTERNATES

Alternate A, employing single-stage activated sludge nitrification, is strongly favored on a cost-effectiveness basis, having a project present worth of approximately one-half that of Alternate C and only 60% of Alternate B. Since all three Alternates are essentially equal from the standpoint of environmental effect and implementation requirements, Alternate A must be the selected plan.

MAJOR FEATURES OF THE SELECTED PLAN

The major elements of the selected system are:

1. Utilization of the existing activated sludge process facilities with modifications, to achieve combined oxidation of organic carbon and nitrification of ammonia.
2. Addition of a secondary effluent pumping station and dual media gravity filtration system on the north bank of the Maumee River adjacent to Pond No. 2.
3. Upgrading of the existing chlorination system to provide a standby capability for breakpoint chlorination of residual ammonia concentrations in the secondary effluent.

4. Use of a filtered effluent weir and cascade structure to aerate the final effluent.
5. Conversion of Pond No. 2 to dual use for combined sewer overflow treatment and detention of poor quality secondary effluent, and the continuation of the capability to use Pond No. 3 as a dual-use facility is planned.
6. Continued use of the headworks, primary clarifiers, anaerobic digesters, and other existing systems for their normal functions.

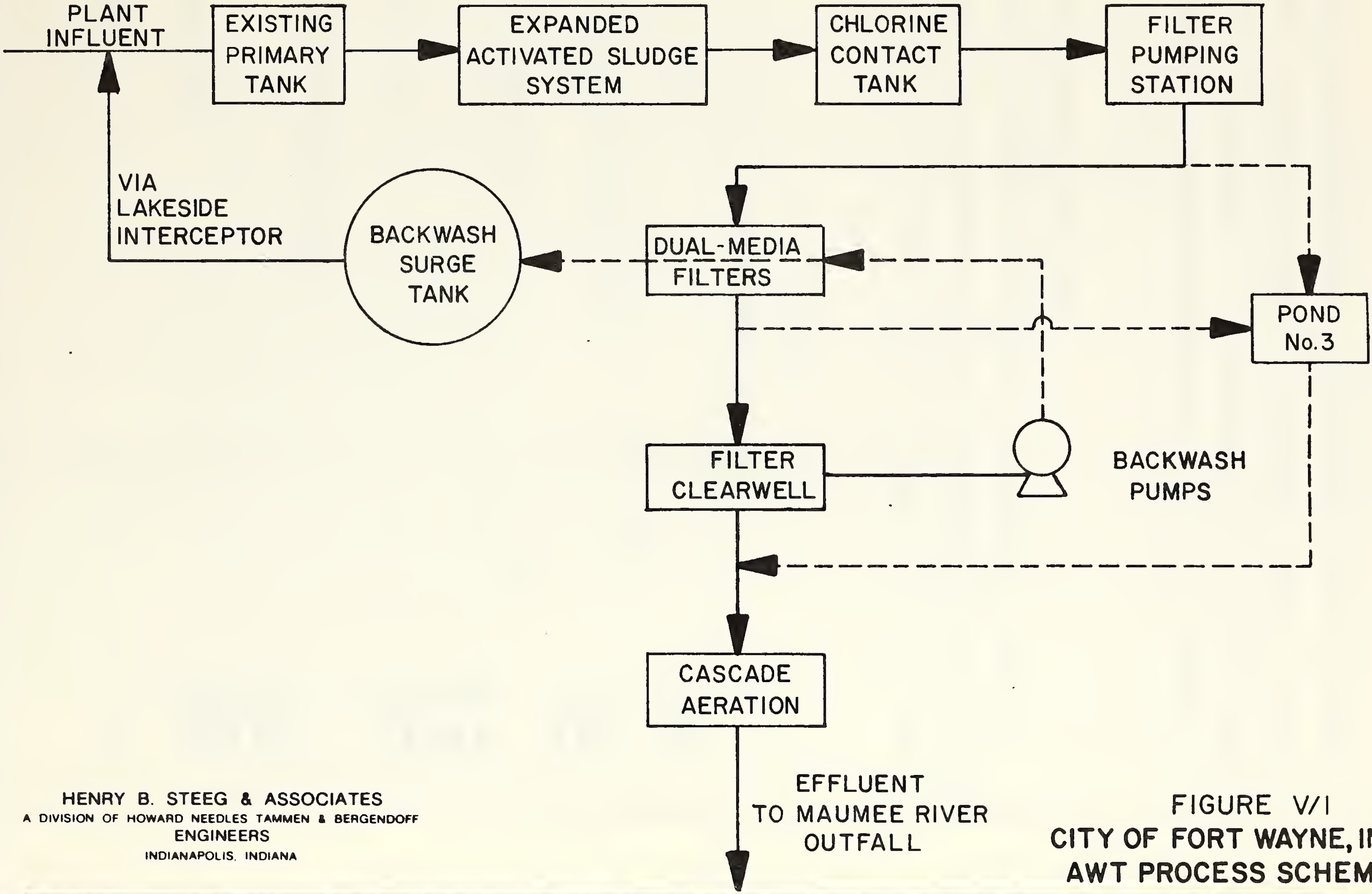
Figure V/1 gives a schematic process flow diagram for the system and Figure V/2 presents the preliminary site plan for the north bank facilities.

ENVIRONMENTAL IMPACTS OF THE SELECTED PLAN

The major anticipated primary environmental impact of the selected plan will be the improvement of water quality in the Maumee River and Lake Erie to which it discharges. The principal secondary impact will be to eliminate a potential obstacle to the growth of the Fort Wayne urban area.

No significant long-term adverse consequences are expected to result from the project. Unavoidable short-term adverse effects resulting from the construction activity may include some soil erosion and river turbidity, dust, noise, and localized traffic congestion. The use of straw matting, wetting, and dust palliatives, and the relative isolation of the site will serve to minimize the effects of erosion, dust and noise.

The permanent alteration of the terrestrial habitat in the small area involved in the proposed construction will be somewhat offset by site



HENRY B. STEEG & ASSOCIATES
A DIVISION OF HOWARD NEEDLES TAMMEN & BERGENDOFF
ENGINEERS
INDIANAPOLIS, INDIANA

FIGURE V/1
CITY OF FORT WAYNE, INDIANA
AWT PROCESS SCHEMATIC

restoration, seeding, and landscaping.

As indicated by the cost estimates in the previous chapter, the project will require a substantial investment of materials, manhours, and energy which will be irretrievable. It is believed, however, that the environmental benefits of the project outweigh the costs of this commitment of resources.

SUMMARY OF PRELIMINARY DESIGN DATA

The anticipated wastewater characteristics are presented in Table V/1. The pertinent design information for the existing facilities was presented in Table II/1. Table V/2 gives a summary of design data for the proposed new facilities.

TABLE V/1

WASTEWATER CHARACTERISTICS

Item	Value
Flow Rate	
Initial Operation, Expanded Plant	40 MGD
Design Average	60 MGD
Design Maximum	72 MGD
Raw Sewage Characteristics	
BOD_5	185 mg/l
SS	200 mg/l
TKN	40 mg/l
NH_4^+-N	24 mg/l
Alkalinity (M.O.)	290 mg/l
pH	7.6
Primary Effluent Characteristics	
BOD_5	140 mg/l
SS	120 mg/l
TKN	35 mg/l
NH_4^+-N	24 mg/l
Alkalinity (M.O.)	280 mg/l
pH	7.5
Temperature	8 - 24°C

CONSTRUCTION COST ESTIMATES AND PLAN OF IMPLEMENTATION

The construction schedule outlined herein is predicated on upgrading the aeration process for implementation of nitrification at the earliest possible date. Table V/2, following, describes the three stages of construction as "Upgrading Aeration Process Efficiency to 42 MGD"(Phase A), "Full-Scale Nitrification to 60 MGD" (Phase B), and "Upgrading Effluent Polishing to 98% Removal" (Phase C). The first stage (Phase A) of construction will permit the operation of the Water Pollution Control Plant in single-stage nitrification in the first few years of operation. Phase A should be complete in October, 1980. The construction cost estimate for Phase A is given in Table V/3, based on the completion of this work in 1978-80.

Phase B and C are intended to be implemented simultaneously. Phase B is located at the present Water Pollution Control Plant on the south side of the river. Phase C is located on the north side of the river in the undeveloped area between Pond No. 1 and 2.

Phase B is work related to the implementation of full-scale nitrification including aeration process changes and standby capability for breakpoint chlorination. Phase C construction includes the necessary secondary effluent pumping, dual media gravity filters for effluent polishing, backwash pumps and dirty water surge tank, nitrified effluent dechlorination and pH control, and incidental site work. The construction cost estimate for Phase B and C is given in Table V/4, following.

TABLE V/2

SUMMARY OF PROCESS DESIGN CRITERIA

	Item	Anticipated Needs	Date Complete
A.	Aeration Process Efficiency Upgrading to 42 MGD	1) Install high-efficiency aeration headers in Tanks 4 and 5.	June, 1979
		2) Install Blower No. 5 to increase aeration capacity to 125,000 SCFM.	October, 1980
		3) Install new return sludge high recycle rate pumps on Tanks 1, 2, 3, 4 and 5 and modify existing secondary sludge collector mechanisms.	June, 1979
		4) Pond dredging pumping system relocation to sludge lagoons.	June, 1979
B.	Full-Scale Nitrification to 60 MGD	1) Install future Blower No. 6 to increase aeration capacity to 147,000 SCFM.	June, 1982
		2) Install new return sludge pumps for Aeration Tanks 6, 7, 8 and 9.	July, 1981
		3) Increase total chlorination capacity to 56,000 lbs./day.	July, 1981
C.	Upgrading Effluent Polishing to 98% Removal	1) Construct 4 new secondary Effluent Pumps @ 24 MGD each.	June, 1982
		2) Construct new Dual-Media Gravity Filters at 14,000 $ft.^2$ @ 3.0 $GPM/ft.^2$ at 60 MGD	June, 1982
		3) Construct 2 each new 23,000 GPM Backwash Pumps.	June, 1982
		4) Construct new Backwash Surge Tank 1.0 MG.	June, 1982

TABLE V/3

CONSTRUCTION COST ESTIMATE FOR AERATION PROCESS EFFICIENCY UPGRADING

PHASE A - AERATION PROCESS EFFICIENCY UPGRADING	Estimated Construction Cost
Blower No. 5 Installation	
Modifications to Blower Building	$145,500
Equipment & Materials	483,500
Installation & Testing	159,000
Electrical	133,000
Aeration Diffusers Efficiency Improvements	
Equipment & Materials	154,000
Installation	96,000
Return Sludge Pumping Efficiency Improvements	
Increase Capacity on Tanks 1,2,3,4,5	100,000
Terminal Pond Effluent Reaeration	
Effluent Reaeration System	80,000
Pond Dredging Pumping System	
Dredgings Pumping Station	150,000
Dredgings Pumping Pipeline	250,000
Electrical & Controls	10,000
Process Control System	
Equipment & Instrumentation	104,000
Process Control System Changes	53,000
TOTAL PHASE A IMPROVEMENTS	$1,918,000

TABLE V/4

CONSTRUCTION COST ESTIMATE FOR NITRIFICATION AND TREATMENT FACILITIES TO 98%

PHASE B - FULL SCALE NITRIFICATION TO 60 MGD	Estimated Construction Cost
Blower No. 6 Installation	
Modifications to Control Building	$295,000
Equipment & Materials	412,000
Electrical	121,500
Chlorination System	
Upgrade 3 Existing Units	25,000
Two New Chlorinators	50,000
Return Sludge Pumping Changes	
Increase Capacity on Tanks 6,7,8,9	120,000
PHASE C - EFFLUENT POLISHING TO 60 MGD	
Secondary Effluent Pumping Station	
Structure	601,000
Pumps & Equipment	192,000
Piping & Valves	120,000
Pump Controls & Electrical	261,000
Dual-Media Gravity Filters	
Structure	2,850,000
Filter Equipment & Controls	3,900,000
Piping & Valves	880,000
Backwash Dirty Water Tank	
Structure	250,000
Equipment & Controls	50,000
Effluent Reaeration and Outfall	
Structures	100,000
Piping & Flow Diversion Gates	40,000

TABLE V/4 - (Cont'd)

PHASE C - EFFLUENT POLISHING TO 60 MGD (Cont'd)	Estimated Construction Cost
Flood Protection Levee & Site Work	
Earthwork	$580,000
Gravel Roadway	20,000
Fencing	40,000
Process Control System	
Equipment & Instrumentation	500,000
Interconnection with Existing Process Control System	250,000
Graphic Panel Additions	150,000
Electrical Work	
Standby Power Generator & Switchgear	300,000
Main Service & Switchgear	250,000
Motor Control Centers	475,000
Process Equipment Instrumentation for Electrical	450,000
Buildings	40,000
Area Lighting	60,000
Operations During Start-Up	150,000
TOTAL ESTIMATED PHASE B & PHASE C CONSTRUCTION COST @ 1980	$13,532,500

CHAPTER VI

PUBLIC PARTICIPATION

On Thursday, January 20, 1977, a public hearing was held at the Board of Public Works, City of Fort Wayne, Indiana, to consider the Second Amendment to the Facilities Plan for Wastewater Treatment. The public notice was published in both the morning and evening papers on December 21, 1976 and December 28, 1976 (See Exhibit A). Several public agencies, civic groups, and commercial and industrial organizations were contacted specially to invite them to present statements at the public hearing (Exhibit B). The attendees were asked to put their names and affiliations on a file card for record purposes. Exhibit C is a listing of the respondents who filled out a record card. An Agenda and Fact Sheet were prepared in advance and passed out to the public and participants (Exhibit D). A location plan diagram was displayed at the hearing (Figure V/2).

Written comments were received from the following:

	Exhibit
Mr. C. James Owen, Director of Community Development, City of Fort Wayne	E
Mr. Jerry E. Dehner, Vice President, John Dehner, Inc.	F
Dr. Jane M. Irmscher, M.D., Allen County Health Commissioner	G
Mr. Robert C. Arnold, Superintendent of Parks & Recreation, City of Fort Wayne	H
Mr. Jack G. Suter, Executive Director of Allen County Plan Commission	I
Mr. James Bredin, Associate Planner, Northeastern Indiana Regional Coordinating Council	J-1
Mr. Elias G. Samaan, Executive Director, Northeastern Indiana Regional Coordinating Council	J-2
Messrs. Jack Dunifon and Vance Amstate, Allen County Board of Commissioners	K
Position Statement Pertaining to Fort Wayne Advanced Waste Treatment from State Agency	L
Mr. Philip L. Schnelker, Philip L. Schnelker Inc., Fort Wayne	M

	Exhibit
Mr. Bernard T. Perry, C.P.A., Rate Accountant, for City of Fort Wayne	N
Mrs. Ethyle R. Bloch and Mrs. Jane H. Dustin, Co-Chairwomen, Clean Water Committee, Fort Wayne Chapter IWLA	O
Mr. R. E. Macy, Manager, Tokheim Corporation, Fort Wayne	P
Mr. Earl Thompson, Plant Manager, Falstaff Brewing Corp., Fort Wayne	Q
Mr. Stephen D. Long, Kennerk, Dumas, Burke & Backs, City Attorneys	R
Mr. Robert S. Olsen, Resident, Fort Wayne	S

Public Hearing Presentation

The Chair for the hearing was Mr. Henry P. Wehrenberg, Chairman of the Board of Public Works, City of Fort Wayne. The hearing was opened by the introductions of some of the participants including staff members of the City and representatives of the consultant (HNTB), industry and the City's utilities' rate consultant. The statutory authority for conducting the public hearing was described as Section 101(e), Federal Water Pollution Control Act of 1972 (Public Law 92-500), applicable Federal rules and regulations under this law, and the laws of the State of Indiana. This authority was reviewed by the Assistant City Attorney and a copy of his opinion is included as Exhibit R.

The public was informed at the time of the hearing that the proceedings were being taped for the purpose of providing a record of the hearing. This chapter represents the summarization of the public hearing taken from the tape transcript and written comments received.

Mr. James O. Russell, HNTB, gave the current definition of the facility planning process. He pointed out that public notice of the hearing had been published 30 days in advance of the hearing and the document representing the considerations of the alternatives examined in the Facility Plan Second Amendment had been on file at the Public Library and Board of Public Works for at least two weeks preceding the hearing. He went on to describe the hearing as being part of Step 1 of a three-step process. A brief explanation of the three-step procedure for obtaining Federal construction grant funding for municipal wastewater treatment facilities was offered. Mr. Russell stressed the present equation of funding is based on 75 percent Federal share, 10 percent State share and 15 percent local share. He also pointed out there is no guarantee that the State's present share of 10 percent will not be changed at some later date. The Federal and State shares were described as being "eligible" under the current rules and regulations.

A recapitulation of the Facilities Plan history was next brought up by Mr. Russell. He stated that the project that is under construction was the subject of a Facilities Plan hearing held in Fort Wayne in December, 1973, and as a result of that public hearing, the Facilities Plan document was amended in 1974. As a condition of the present Step 3 construction grant awarded to the City of Fort Wayne for the construction of wastewater treatment facilities on the Maumee River, the grantee (i.e. City of Fort Wayne) was required to conduct an examination of additional levels of treatment to meet the Water Quality Standards for the receiving waters.

Mr. Russell stated the purpose of the hearing was to:

1. Discuss the project that is the subject of the present Facilities Plan Second Amendment;

2. Present the alternatives considered in this Plan;

3. Assess the environmental and economic aspects of the proposed Plan; and

4. Establish a public exchange of viewpoints regarding the acceptability of the Selected Plan to meet the Water Quality Standards.

Mr. Don R. Ort, HNTB, briefly reviewed the project history dating back to the Master Plan for Wastewater Treatment commissioned by the City of Fort Wayne in 1968 and prepared by Henry B. Steeg and Associates. He described the 1974 Step 3 Federal construction grant authorizing the present plant expansion for secondary treatment to 60 MGD provided the basis for the study of ammonia nitrogen removal to meet the requirements of the NPDES Permit and Indiana Stream Pollution Control Law. In later considerations, this ammonia removal requirement became denoted as advanced waste treatment. Mr. Ort presented photographs of the treatment plant under construction to illustrate the area affected by the proposed ammonia removal and effluent polishing facilities.

(PHOTO 1)

The first photograph taken in September, 1975 clearly showed the present treatment plant location on the south side of the river and the area dedicated to permanent effluent polishing facilities on the north side of the river. Some comment ensued regarding the characteristic muddy appearance of the Maumee River at Fort Wayne.

(PHOTO 2)

The second photograph taken in March, 1976 depicted the river again from the air when ice floes clogged the river. It basically showed the intended area for the effluent polishing facility from another angle.

(PHOTO 3)

Another photograph, taken in March, 1976 shows the same general vicinity.

(PHOTO 4)

This view taken in July, 1976, shows the plant primary treatment facilities in the foreground, with the aeration tanks with the secondary settling beyond the primary tanks.

(PHOTO 5)

The stormwater pond was photographed in January, 1975 shows the clear pond water quality and the turbid river conditions.

(PHOTO 6)

The stormwater treatment facility discharge is shown in the next photograph taken in January, 1975.

(PHOTO 7)

A photograph taken in June, 1976 showed a partially nitrified effluent going into Pond No. 3. This photograph was taken to shown the clarity and absence of green algal coloration in this pond effluent.

(PHOTO 8)

The outfall structure from Pond No. 3, taken in August, 1976, shows a typical secondary treatment effluent coming down the channel to intermix with the turbid low flow waters of the Maumee.

Mr. Ray H. Kocher, HNTB, reviewed the plant expansion construction progress on all three divisions of plant construction:

Division I - Water Pollution Control Plant (76 Percent Complete

Provides secondary treatment capacity to 60 MGD by the addition or modification of existing grit removal units, primary effluent box, new aeration tanks, new settling tanks, new secondary effluent chamber, new raw sewage pumps, new engine generators, new air supply blowers, new blower building, additional chlorination equipment, new gas compressors, addi-

Photo 1 - Aerial View of Water Pollution Control Plant Location and Proposed Site of Advanced Wastewater Treatment Facilities Looking North

Photo 2 - Aerial View of Water Pollution Control Plant Location and Proposed Site of Advanced Wastewater Treatment Facilities Looking South

Photo 3 - Aerial View of Water Pollution Control Plant Location and Proposed Site of Advanced Wastewater Treatment Facilities Looking North

Photo 4 - Water Pollution Control Plant Primary Treatment and Aeration Treatment Facilities

Photo 5 - Aerial View of Terminal Pond No. 1 and Maumee River at Discharge Point

Photo 6 - Stormwater Treatment Facility Discharge into Pond No. 1

Photo 7 - Terminal Pond No. 3 Appearance in June, 1976 on Partially Nitrified Effluent

Photo 8 - Terminal Pond No. 3 Discharge Point at Maumee River Showing Mixing Zone tional gas storage tanks, engine jacket water cooling system, new plant water pumping and distribution system, new raw sludge pumps, new laboratory facilities, new office facilities, a plant process control system, new railroad siding, chemical handling and storage facilities, electrical work, piping, sluice gate, meters, pumps, valves, etc.

Division II - Terminal Ponds and Stormwater Treatment
(97 Percent Complete)

This division consists of construction and modification and cleaning of an existing Pond No. 1 as noted on the slides shown earlier, and the construction of two additional ponds. These three ponds provide flexibility of operation as terminal ponds for treatment of plant effluent, or as combined stormwater treatment ponds through the construction of new pumping facilities, interconnecting structures, outfall structures and ditches.

Division III - Sludge Treatment Lagoons (98 Percent Complete)

This portion of the work was described as virtually complete.

Philip R. Boller, City of Fort Wayne, presented the NPDES Permit requirements in Permit No. IN 032191 effective December 30, 1974. The ammonia nitrogen removal requirements that were set forth in this permit to take effect in January, 1979 were reviewed briefly. Mr. Boller pointed out that the City had requested a revised compliance schedule which included a lengthy study period for plant scale testing for ammonia nitrogen removal.

Mr. Delmar H. (Del) Prah, HNTB, presented the Selected Plans from the Facilities Plan document. He pointed out that the schedule contained in the present NPDES Permit would not be possible to meet because experience has shown that design and construction of similar facilities elsewhere takes from 4-1/2 to 5 years to complete. The City authorized the preparation of a report resulting in an NPDES Permit modification request submitted to the State Agency in December, 1976. This permit modification was necessary to provide plan of implementation for ammonia nitrogen removal and effluent polishing required under the NPDES Permit. The permit modification request established a schedule for the construction of single stage nitrification for ammonia removal by 1978, plant expansion capacity by 1983, and effluent polishing facilities by dual media gravity filters by 1983.

Mr. Prah briefly described the pilot plant work as intended to use the existing expanded and upgraded facilities to the maximum extent possible. A treatment process selection utilizing single stage nitrification for ammonia removal was shown to be possible. Plant scale pilot testing was necessary to establish whether it was physically possible to implement a change of process such as single stage nitrification to meet the effluent limitation using the existing tankage. The results of this effort showed it was indeed possible and this option was determined to be the least expensive alternative considered.

The necessity of consideration of nitrification came up in the public hearing. Mr. Prah described the present NPDES Permit limitations as originating in a survey conducted by the State of Indiana and the U. S. Environmental Protection Agency in 1973, published in a report in 1974, entitled "Waste Load Allocation Study for the (Upper) Maumee River". In this report, a relationship was established between the discharge of oxygen-demanding materials such as biochemical oxygen demand and ammonia nitrogen and the dissolved oxygen in the stream. A relationship exists between these materials and the stream Water Quality Standards such that the discharge of oxygen demanding materials may deplete the oxygen in the stream below the standards of the State. The goal of the NPDES permit was said to be meeting the Water Quality Standards of the State under all conceivable operating conditions. The relationship for the Water Pollution Control Plant is such that when the ammonia is high, the biochemical oxygen demand must be low. When the biochemical oxygen demand is high, the ammonia must be very low. Essentially, there is a zone of operating conditions in terms of allowable concentrations represented by an inverse relationship, shown at the public hearing as Figure 1 of the NPDES Permit modification request.

The lowest statistical flow recorded for seven consecutive days in a ten-year period was used by the State in their model as stipulated by the Water Quality Criteria for the State of Indiana, Indiana Stream Pollution Control Board Regulation SPC-1R3.

A discussion of the use of the pond as a holding pond for nitrified effluent followed. From past operation experience, it was possible to infer that the pond might meet the stringent effluent criteria established for this plant. But, to guarantee the performance of the plant over all conceivable circumstances at 98 percent removal efficiency, was described as the limitation of technology in municipal treatment processes of the type already employed at Fort Wayne. The resultant process selection was to go with a very high efficiency process to provide a safe operating zone to bring the nitrified effluent BOD and suspended solids down to the levels that would meet the NPDES Permit. This treatment process was described as "dual-media gravity filters" to strain out the solids and thereby clarify the plant effluent. This process selection was described as "extremely efficient". It was conceded that gravity filters are admittedly very expensive to build plus has some additional operational costs associated with it.

Mr. Prah described the manner of implementation in terms of "staging of construction for implementation of advanced waste treatment" with the goal of having the plant in compliance with the requirements of the NPDES Permit at the earliest possible date. If the work was to start "tomorrow" (meaning January 22, 1977), the earliest date for the additional aeration blowers and aeration process efficiency improvements was the end of 1978 based on the present construction experience and the availability of Federal funding for the necessary work. This comes approximately six months ahead of the requirements of the present NPDES Permit for a nitrified effluent, given a prudent amount of time for construction.

The second phase of the plan was described as adding an additional sixth aeration blower in the summer of 1982 to provide standby aeration capacity up to full plant flow of 60 MGD necessary to preserve the reliability and operability of the plant process in nitrification at full design flow. Additional return sludge capability to aeration tanks 6 through 9 would be required. Chlorination capacity will be increased sometime in the future because breakpoint chlorination would be the standby system for nitrification in the plan.

The third phase of construction involves the construction of dual-media filters and other incidental construction that goes along with this phase. There is six months difference between the second phase and this third phase because of startup and shakedown experience required to place these facilities into operation. This puts this work into the first quarter of 1983 by all estimates to date. The site selected for this work has already been dedicated for advanced waste treatment. Major features of the plan were pointed out on the location plan diagram.

Phase A was discussed next, and this work was described as that work at the Water Pollution Control Plant necessary to implement single-stage nitrification at the earliest possible date.

Mr. Prah pointed out that certain changes in equipment were required at the plant. One of the key requirements of the proposed process was the installation of additional aeration capacity. A pad for an additional blower had already been provided in the present plant expansion, as is customary in municipal treatment plant design. For single-stage nitrification process, significantly more air is required to maintain a stable, nitrified effluent. Adding this aeration capacity with the least amount of change to the present plant operations was another consideration. Therefore, a new Blower No. 5 was recommended for the location in the Blower Building. This could be accomplished in the next two years at an estimated construction cost of $710,000. An additional Blower No. 6 might be required in 1982 or so, estimated to cost $1,023,500 at that time.

Mr. Prah described the item relating to the replacement of the aeration distribution system in two of the existing aeration tanks. In the present plant construction, aeration distribution headers were selected to provide very high efficiency aeration capacity to the diffusers to maximize the amount of oxygen available to the process. This improvement would be advisable from a power consumption cost reduction and aeration distribution system efficiency improvement perspective alone. The estimated construction cost for this work was $250,000 and would probably be required some time in the future anyway.

Mr. Prah also described the necessary changes in return sludge pumping capabilities required for single-stage nitrification at the Water Pollution Control Plant. This work was said to be necessary to raise the amount of biological solids under aeration to the higher levels required for nitrification. Additional return sludge pumping capacity was estimated at $100,000 construction cost. It would be advisable on efficiency and operations and maintenance cost considerations, exclusive of the nitrification requirement.

Another process improvement required in the first phase of work was the terminal pond effluent reaeration system. This item was estimated to be $80,000 construction cost if accomplished by 1978.

The experience with attempting to treat terminal pond dredgings at the plant while operating in a nitrification mode was described as "messing up the works". A construction cost estimate of $410,000 was presented for completion in 1978 for this work, involving relocating the present sewer lines for pond dredgings to the existing digested sludge lines going to the sludge lagoons.

Additions and improvements to the plant process control system were discussed. The estimated cost for updating the equipment and instrumentation, plus process control system procedural changes, was estimated to cost $121,000 if completed in 1978.

The total cost for completion of this first phase of work implementing nitrification by January, 1979 up to a plant flow of 42 MGD, was $1,671,000 (see Fact Sheet). Mr. Prah briefly described the work for the Phase B construction. A construction cost estimate of $1,023,500 for the work, assumed to be constructed in 1982 (see Fact Sheet).

Phase C work was broken down by major elements in the Fact Sheet also. A total estimated cost of $12,509,000 for construction in 1982 was provided in the Fact Sheet.

The alternatives examined in detail in the Facilities Plan amendment were discussed: single-stage nitrification, two-stage activated sludge nitrification, and two-stage nitrification utilizing the present Water

Pollution Plant for conventional secondary treatment followed by trickling filter nitrification. The alternatives selected were evaluated on the basis of reliability, least cost from capital investment, operations and maintenance costs, and environmental assessment potential. Single-stage nitrification was described as "probably more reliable" because of its successful implementation in the pilot study. Single-study nitrification utilized existing tankage to the maximum extent. In O & M costs, single-stage nitrification came out second to the two-stage system utilizing trickling filters but the difference was on the order of $10,000 per month based on an estimated aggregate of $1.3 million per year. Each of the options studied were described as having the same end result for BOD_5 and ammonia nitrogen removal.

For 98+ percent removal of suspended solids and BOD_5, the dual-media filter method was adopted as the tried-and-proven method while attempting to meet the limitation with the ponds on a trial basis. The ponds were described as "feasible operating tools" for meeting the effluent standard some of the time. They were said to be required in any case to store poor quality effluent from the secondary treatment plant and to allow reduction of operating costs for the gravity filter when the pond suspended solids are low enough to meet the Water Quality Standards.

Public Participation

Mr. Wehrenberg read several letters into the record. One from Mr. C. James Owen, Director of Community Development and Planning, City of Fort Wayne, expressed full support of the Facilities Plan to attain the City's water quality goal (Exhibit E).

A letter from Mr. Jerry Dehner, Vice President, John Dehner, Inc., said the plan to install an additional blower in the Blower Building would be sufficient and cheaper than the installation of a large number of filters (Exhibit F).

Dr. Jane M. Irmscher, M. D., Allen County Health Commissioner, wrote a letter fully supporting the Facilities Plan, and was read into the public record (Exhibit G).

A letter from Mr. Robert A. Arnold, Superintendent of Parks and Recreation, was received and read into the record. The Park Board goals of preserving natural land and water resources was cited and the Board of Public Works was urged to implement plans to increase the efficiency of the Water Pollution Control Plant by providing advanced wastewater treatment in the continuing effort to "reach the goal of 100 percent pollution abatement in the Maumee River" (Exhibit H).

Mr. Jack G. Suter, Executive Director of the Allen County Plan Commission, submitted a letter which was read into the record at the hearing. In essence, the Plan Commission supported any efforts which would better achieve optimum water quality including the recommended improvements in plant treatment efficiency and providing advanced wastewater treatment by adding facilities to remove ammonia nitrogen at the site of the terminal ponds (Exhibit I).

Mr. Joseph Morreale read into the record an unsigned, undated position statement received from Mr. Horace Smith prior to the public hearing presenting the State Agency's views regarding the proposed Facilities Plan Amendment (Exhibit L).

Mr. Bernard Perry, C.P.A., Rate Consultant for the City of Fort Wayne, presented information regarding the proposed industrial cost recovery and user charge system which was submitted as the third revision to the U. S. Environmental Protection Agency at the time of the public hearing. The rate structure of the proposed user charge system was used in the preparation of the Fact Sheet even though it has yet to be implemented because the present rate structure is outmoded and would be replaced. Mr. Perry's submittal to the Board of Works at the time of the public hearing is contained in this report as Exhibit N. Additional verbal comments and discussion regarding the impact of this proposed project on the user charge and cost recovery work at Fort Wayne follows.

Mr. Perry established the history of the User Charge System as it awaits EPA approval (see Exhibit N). Using those rates as a basis, Mr. Perry presented the estimated effects of the three phases of the Facilities Plan on the user charges. The 100% commercial/industrial user charge, as presented in the Fact Sheet, per hundred cubic feet is 26.1¢ with the domestic charge being 32.0¢. Mr. Perry pointed out that in consideration of the average step rates to date, the actual charges are more nearly 18-20¢ for large industrial users, 28-30¢ for small industrial/commercial users, and 35¢ for residential users. These figures did not include the debt retirement and O & M costs for the plant expansion.

Using more up-to-date operating costs from 1976 and a more pessimistic inflation rate than the engineer used, Mr. Perry estimated the user charges at the completion of the plant expansion in 1977 to be 45.9¢ per hundred cubic feet for domestic users and 41.4¢ per hundred cubic feet for industrial/commercial users. The completion of Phase A in 1978 would require $20,550 per year for additional debt retirement, $447,000 per year for O & M, and $62,000 per year for additional replacement costs. As a result, the City would spend $250,000 (15% share) for Phase A, but O & M and capital costs would be $6,000,000 for Phase A as compared to $14,380,000 without Phase A. This corresponds to charge of 50.1¢ per hundred cubic feet and an industrial/commercial charge of 46.1¢ per hundred cubic feet. The completion of Phase B and C in 1983 would require a capital outlay from the City of $230,000 but the additional incremental O & M costs would be $2,905,000 per year, a large part of which would be due to electricity. The additional replacement costs and bond service would create a total user and capital cost of $9,600,000 which would yield a domestic user charge of 79.1¢ per hundred cubic feet and an industrial/commercial user charge of 78.6¢ per hundred cubic feet. Mr. Perry stated the allocation of costs to the classes of customers was based on the loadings of BOD and suspended solids attributable to the various classes of users by studies made by the City.

Mr. Perry stated the reasoning which established the Industrial Cost Recovery System as part of the Federal grant. The effect of the implementation of all phases of the Facilities Plan would be an increase from 2.86¢ per hundred cubic feet in 1977 after completion of the plant expansion to 4.16¢ per hundred cubic feet after completion of Phase A - C with 0.14¢ of the increase due to Phase A and 1.16¢ due to Phase B and C. Mr. Perry summarized his statement by indicating the capital costs for the proposed project are minimal but the O & M costs are very substantial.

Mr. Morreale emphasized that the City of Fort Wayne would comply with the State and EPA requirements but the City desires to implement the project in phases in order to provide time for operating the ponds on a nitrified effluent. Mr. Morreale pointed out that the City wished to prove that Phase A alone can meet the requirements and, therefore, save the citizens and customers of Fort Wayne significant sums of money. Mr. Morreale took exception to the State request to delete testing of the ponds as part of the cost effective alternative. Mr. Morreale called upon Mr. Paul Brunner, Superintendent of the Water Pollution Control Plant, to respond to the State policy statement because of Mr. Brunner's experience in wastewater treatment.

Mr. Brunner stated that the monthly BOD limitation of 10 mg/1 in the State policy statement was based on ultimate BOD and when considered with the ratio of ultimate BOD to 5-day BOD of 2.05, the monthly average for 5-day BOD would be less than 5 mg/1. Mr. Brunner further stated that Fort Wayne has done a very good job of cleaning up the Maumee River and has an extensive on-going stream monitoring survey which indicates the actual assimilative capacity of the river. Mr. Bruner said the discharge from industries would have to be carefully watched due to possible upsets of the sensitive nitrifying bacteria in the single-stage nitrification system. If such an upset did occur, heavy chlorination would be necessary to oxidize the ammonia and then possible cancer-causing chlorinated organics could be formed. Mr. Brunner concluded by emphasizing that dual-media gravity filters would not remove soluble BOD, and that on that basis, he opposed such an installation.

Mrs. Jane Dustin of the Izaak Walton League Clean Water Committee questioned the ultimate size of the treatment plant, the ultimate size of the service area of the Facilities Plan, and the volume of sewage from the county that the treatment plant can handle. Mrs. Dustin said the alternatives of treatment and discharge, treatment and reuse, and treatment and land disposal were not adequately considered as well as the land disposal of sludge. Mrs. Dustin wanted the industrial surveillance report as part of the Facilities Plan in order to identify the industries that discharge into the City sewer system, what is being discharged, and who will be required to pretreat before discharge. Mrs. Dustin desired the information on possible discharges of toxics, flammables, and radioactive materials to the sewers and what metals and other materials are going through the treatment plant. She explained how the industrial cost recovery system worked and she wanted to know whether a City user charge ordinance had been drafted.

Mr. Perry responded that the Industrial Cost Recovery System proposed by the City is pending EPA approval. Upon EPA approval, the system must be adopted by the Fort Wayne Common Council to become law and that collection under this system must begin when 80% of the plant expansion Federal grant is reached.

Mr. Russell re-emphasized that the Facilities Plan is a second amendment to the Facilities Plan reviewed at the December, 1973, public hearing. The plant size of 60 MGD and the service area were established in 1973 and the second amendment validated the applicability of the plant size and service area for the present plan.

Mrs. Dustin next addressed the environmental assessment section of the Facilities Plan and objected to the many river crossings due to the treatment plant being on two sides of the river. She stated the diking and encroachment on the flood plain were not adequately examined in the environmental assessment. Mrs. Dustin concluded by stating that the waste load allocation is designed to protect a segment of a stream from both municipal and industrial discharges, so if the City is allowed to deviate from the standard, then so should the industries which have discharge permits. Mrs. Dustin said this would be detrimental to the water quality of the river.

Mr. Russell answered the question about the effect on the flood plain by stating that in 1970, the alignment of the ponds and levees were submitted to the Department of Natural Resources. When the ponds were built, they were either in the approved alignment or landward. Mr. Russell went on to say that the sludge lagoons were submitted to the Department of Natural Resources in 1974 and adjustments in the lagoon alignment were made using Corps of Engineers hydraulic design data. The sludge lagoons, as a part of the plant expansion already underway, did not increase flood stages through the reach within the accuracy of the design data. Mr. Russell concluded by stating that the proposed facilities are landward of the approved alignment.

Mr. Prah responded to Mrs. Dustin's question regarding land application of wastewater by pointing out that land application was considered for this project. However, the soil types of this area were not favorable and the construction costs of such a system would be in excess of $50 million and, therefore, not cost-effective. The reuse of the treated wastewater was also considered; however, the present facilities planning process does not allow for a treatment process component to be considered for part of a facility selection. Mr. Prah said the reuse of the treated wastewater for other purposes was not precluded and was a matter of economics. Mr. Prah indicated that the industrial surveillance report is a requirement of the NPDES Permit of the City and is not a part of the facilities planning process at this time.

Mrs. Ethyle Bloch of the Izaak Walton League Clean Water Committee expressed displeasure with the timing of the public notice for the hearing and with the short time the documents were available for public inspection (2 weeks). Mrs. Bloch wanted to know if the advanced waste treatment plant would treat toxic and hazardous materials, radioactive materials, heavy metals, and plastics.

Mr. Prah answered this question by stating that advanced waste treatment is treatment beyond secondary treatment and the Facilities Plan specifically calls for ammonia removal and effluent polishing. Since the treatment plant effluent meets the drinking water standards of the U. S. Public Health Service such a large percentage of the time, consideration of heavy metals was not deemed necessary at this time. Mr. Prah stated that a treatment plant removing 98% of the organics and suspended solids will incidently remove the types of pollutants referred to by Mrs. Bloch, if they are in the solid form.

Mr. Perry indicated that the EPA requires that the City identify substances in the treatment plant effluent that are toxic to fish. Amendments to Chapters 24 and 34 of the Fort Wayne Municipal Code are to conform to this EPA regulation. The Municipal Code indicates what substances may be introduced to the system.

Dr. Ronald F. Wukasch, of Purdue University, stated that industrial pretreatment guidelines says that only materials that can be successfully treated at the plant may be discharged to the sewers, but materials that would be deleterious to either the operation of the plant, disposal of sludge, or the receiving waters may not be discharged. It is the responsibility of the industrial surveillance task to identify those substances and the responsibility of the EPA to define toxic materials. Radioactive materials are illegal to discharge to public owned treatment works. Dr. Wukasch continued by saying that the intent of a treatment plant is to treat things that can be treated, like BOD and ammonia, and materials that cannot be treated should be kept out of the sewers. Mrs. Bloch said she remained concerned about acci-ental spills of such toxic materials.

Mrs. Bloch questioned the inclusion of the NPDES Permit modification request in the Facilities Plan since the State had not responded to it. Mrs. Bloch also noted that Hobson Road Extension, shown on the site plan as cutting through the area dedicated to the treatment plant, was not addressed.

Mr. Russell pointed out that the Hobson issue was addressed and the alignment was included to show that this proposed project was not in conflict from a physical standpoint with the treatment plant expansion.

Mr. Philip L. Schnelker, citizen of Fort Wayne, submitted letters to the Board of Public Works concerning this Facilities Plan. These letters are found in Exhibit I. Mr. Schnelker stated "the NPDES Permits are prepared in a questionable manner utilizing much empirical data with little attention being given to attacking the water pollution problems in a case by case basis...". He said that he though the entire AWT project is needless and unattainable. Mr. Schnelker expressed the viewpoint: because Fort Wayne can afford the project from its historically comparatively low sewage rates, this argument looks "relevant". Mr. Schnelker questioned the number of times the rate can be doubled until the industries and residents cease paying. At this point, he asked Bernard Perry to comment on the rate-doubling problem for the City.

In response, Mr. Perry presented information on Consolidated Edison of New York and said that in 1974 they had collected only 68% of the billings. Mr. Perry said if costs continue to escalate at this rate, that someday no one will be willing to pay the bill.

Mr. Schnelker commented that in 1970, the O & M costs for the sewage treatment plant were only $360,000 and in 1983, they are projected to be $4,460,000. Mr. Schnelker stated the priorities are confused and at best, the AWT project is premature since the current plant expansion project is not complete and its performance not evaluated. Mr. Schnelker said his opinion was to first provide sewers to all densely populated areas that do not now have sewers, resolve the combined sewer overflow problem, then as a last resort, consider the AWT project. Mr. Schnelker stated there were other sewage treatment plants in the area that construction of this project was not going to affect. Mr. Schnelker questioned the limitation of 10 mg/l of ultimate BOD and the ability to measure this quantity with the standard five-day BOD test. He then asked Paul Brunner if he could live with a limitation of 5 mg/l as BOD_5. Mr. Brunner responded by stating the present standard five-day BOD test leaves a lot to be desired.

Mr. Art Blaising, President of the Riverhaven Community Association, complained about dust coming from the sludge lagoon construction area, particularly during the week of Christmas. He also expressed concern over excessive flooding of the Riverhaven area due to the construction of the levees around the sludge lagoons. Mr. Blaising said he was concerned about possible odors during the summer from the sludge lagoons.

Mr. Russell responded by pointing out the flooding situation had been considered and adjustments were made in the sludge lagoons actually constructed. These adjustment included a landward movement of the proposed levees, a reduction in the excavation on the river side of the lagoons, and the construction of an overflow channel to compensate for the encroachment. The result of this was an improvement of the hydraulic capacity through this area. A calculated increase in the river stage of less than one inch for the 100 year discharge through the area was projected.

Mr. Brunner responded to the dust problem and said the dust blowing described was an area wide problem, extending as far north as Leo, Indiana. Mr. Brunner said he thought due it was due to the agricultural practices of the area and the dry ground in December. As a result, the dust was being carried long distances. Mr. Brunner said odors reported in the area around the sludge lagoons were emanating from another sewage treatment plant in that area. The sludge lagoons directly across from Riverhaven are used for waste lime sludge from the water treatment plant which is inert and odorless.

Mr. Ed Ross, a resident in Riverhaven, commented on the dust problem and complained about the cutting down of trees along the river. Mr. Ross said these trees would have been a good wind screen but they were cut and bulldozed into the river and left there along the river.

Mr. Prah responded to an earlier question regarding the inclusion of the permit modification request in the Facilities Plan by pointing out that the phasing of construction made in the modification request was an important part of the plan. A public hearing on the modification request will probably be held but the State is responsible for that. Mr. Prah indicated that the modification request was included in the Facilities Plan to provide as much information as possible for this public hearing.

Mr. Russell emphasized that the NPDES Permit limits are a part of the facilities planning process and the inclusion of modification request was necessary to clarify the impact of the permit conditions with respect to the Facilities Plan.

Mr. Blaising questioned whether Riverhaven is part of the service area and if it would be picked up as part of the Fort Wayne system. He was assured that Riverhaven was included in the planning area.

Dr. Wukasch pointed out that the 7-day, 10-year low flow condition would occur 3 to 5 separate days every year. He stated that PL 92-500 has as an objective to make the rivers swimmable and fishable. Since fish are a sensitive indicator of the quality of the river, one bad day could cause a fish kill. Dr. Wukasch stated that the law required the water quality standards must be met. At this hearing, the only arguable points are refinements in the permit to improve operations and the appropriateness of the selected plan for attaining the water quality standards, and the selection of that plan based on cost. Dr. Wukasch concluded by indicating that Fort Wayne had done an excellent job of wastewater treatment having had secondary treatment for years, and had the foresight to build the ponds while the land was available. Fort Wayne was described as being in better financial shape than most cities that are faced with meeting present-day AWT requirements. The relative cost of AWT for Fort Wayne was described as a lot less than other comparable projects.

Mr. Wehrenberg invited those attending to submit written comments for the record by January 31, 1977. The hearing was adjourned at 9:50 P.M.

Written Comments Received

In addition to the public verbal comments expressed at the hearing and summarized above, several written comment letters were received in the open record period of ten days following the public hearing. Mr. Philip Schnelker, a participant at the hearing, sent a letter to the Indiana Stream Pollution Control Board, copy to the City, requesting an advance copy of the public hearing summary be made available for public comment. He asked that the color photographs be included in the public record; inquired as to the changes between the January, 1974 and May, 1974 Facilities Plan deleting the retention pond concept whereas these ponds were at present under construction utilizing EPA and State grant funding; expressed the contention that the State and EPA's case in requiring this project was "in essence presented by the Engineers with little or no backup as to how the State and/or EPA arrived at their position"; questioned the necessity of the hearings at all; pointed out that the BOD_5 to BOD ultimate ratio was arbitrarily set at 2.05 which puts the monthly average BOD_5 at 4.88 mg/l for a monthly BOD ultimate of 10 mg/l; cited an EPA reference which indicated the standard error in measurement for BOD_5 on natural water samples articicially innoculated with an eact amount of biodegradable organic compounds was ± 0.7 mg/l based on a mean value of 2.1 mg/l [a relative error of 33%] and ± 26 mg/l based on a mean value of 175 mg/l [a relative error of 15%], the plant effluent D.O. requirement is the same as the current water quality criteria standard for trout spawning and might even be above the saturation point at times; questioned the necessity of ammonia nitrogen removal; asked if the State and EPA are "absolutely guaranteeing the [desired] result... if said design [were] implemented"; stated he had designed a dual-media filter put into operation within the proceding year and he could state emphatically that the monthly average of BOD_5 will never get down to 4.88 mg/l as required by the State's limits; and concluded that the proposed project cost of $16,000,000 and an additional $2,900,000 in operations and maintenance costs deserved more in-depth consideration than had been given to date (see Exhibit M).

Written comments were also received from the Clean Water Committee of the Fort Wayne Chapter by Mrs. Bloch and Mrs. Dustin. They expressed appreciation to the City for placing the Facilities Plan documents in the Public Library for use of citizens outside working hours. They objected to the unavailability of the Fact Sheet prior to the public hearing; said the North Area Site Plan included in the Facilities Plan Second Amendment was difficult to read and incorrect in some details; the lack of public mention of the NPDES Permit modification request prior to the poublic hearing and contended the information contained therein could have been woven into the context of the Plan; pointed out the Position Statement was very stringent but not official because it has not been through the process of public comment; expressed their concern over toxic and hazardous materials getting to the treatment plant from accidents, spills, and non-point sources, chlorine used for breakdown of nitrogen and disinfection, the excessive cost of electricity and contended this use could be "reduced very much by using the methane gas from the sewage operation"; complained the Committee had been repeatedly denied the right to see the industrial surcharge collections list under the City's Municipal Code and said this is an unfair practice to cause the residential customer to bear all the cost of the plant expansion; desired to see the new proposed new rate structure for sewage service, surcharge rates and industrial cost recovery included in the Facilities Plan even though it had not been formally adopted by the City Council or approved by EPA; requested an accounting of the volume of industrial wastes received, what kinds of wastes are now treated at the plant and are expected in the future, the list of connected industrial users previously served, what charges these industrial users presently pay, a complete analysis of the costs and expenditures of the plant, those industrial users required to pretreat their wastes, and the proper use and deposit of the funds collected under the proposed industrial cost recovery system for the City; requested to the Clean Water Committee of all grant funding, past and present, for Federally-funded projects; questioned the specificity of the Facilities Plan Environmental Impact Statement; questioned why trees were cut down along the river in the vicinity of the sludge lagoons constructed under C 180538; why was it necessary for sewer lines to cross the river again and again unnaturally; alleged that the effect of future growth on the treatment plant was not covered nor were land use controls or transportation needs; complained about the lack of a map depicting all sewers and interceptors, whom they serve, where they enter the treatment plant, location of all storm sewers, pumping stations and the area of the county anticipated to be included in the service area including the purchase of the private utilities and their facilities; and finally, requested the State and U. S. EPA to withhold further funds from Fort Wayne until the Facilities Plan and corresponding documents are correct and complete.

A letter from Mr. R. E. Macy, Manager of Facilities, Tokheim Corporation at Fort Wayne, expressed support to the positions of Mr. Morreale, General Superintendent of City Utilities and Mr. Brunner, Superintendent of the Water Pollution Control Plant registered at the public hearing in opposition to the plan. The writer also expressed concern that the proposed project will place a heavier burden on existing Fort Wayne industry while simultaneously discouraging new industry from locating in Fort Wayne (Exhibit P).

Mr. Earl Thompson, Plant Manager, Falstaff Brewing Corporation, sent a letter for the record stating that current user fees and other taxes on Fort Wayne operations exceed all other Falstaff breweries in the nation. He also said in his letter that Falstaff was in a position where it was becoming increasingly difficult to maintain a brewery in Fort Wayne. He said "it is probable that Falstaff will find the projected sewer rate increase...intolerable". (Exhibit R).

A letter from Mr. Robert S. Olsen, a citizen of one of the areas said to be included in the future service area of the Fort Wayne City Utilities, wrote a letter included in the record as Exhibit S. He stated he understood the process selection to be described as "single-stage" whereas he "actually knew...two biochemical reactions must take place...". He said the Indiana Stream Pollution Control Board was acting in an irresponsible manner by demanding that advanced wastewater treatment be continuously employed without regard to the condition of the Maumee. If ammonia is a problem only at times of very low flow conditions, the additional aeration should be employed only at such times. Removal of the last traces of suspended solids by sand filtration before mixing with the Maumee was said to be lacking of logic. Operating costs were said to have never taken into consideration by the consultants.

APPENDIX A

NPDES PERMIT IN 0032191 AND MODIFICATIONS

Permit No. IN0032191

Application No. IN0032191

Expiration Date December 31, 1979

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Water Pollution Control Act, as amended (33 U.S.C. §1251 et. seq.) (hereinafter referred to as "the Act')

THE CITY OF FORT WAYNE

is authorized by the Director, Enforcement Division, U. S. Environmental Protection Agency, Region V, to discharge from the municipal wastewater treatment facility located at 2600 Dwenger Avenue, Fort Wayne

to the Maumee River

in accordance with the conditions specified in Attachments A and B.

Permittee is not authorized to discharge after the above date of expiration. In order to receive authorization to discharge beyond the above date of expiration, the permittee shall submit such information, forms, and fees as are required by the Agency authorized to issue NPDES permits not later than 180 days prior to the above date of expiration.

This permit shall become effective 30 days from this date of signature.

Signed This 30 DEC 1974

Acting Director, Enforcement Division

ATTACHMENT A

EFFLUENT LIMITATIONS, AND MONITORING AND OPERATIONAL REQUIREMENTS

1. Treatment Facility Description

The discharger presently has the following treatment system:

The existing Fort Wayne wastewater treatment facility is a conventional activated sludge (Class IV) plant with effluent chlorination, phosphorus removal facilities and a 2-day terminal holding pond. The plant is capable of providing grit removal, pumping and primary treatment for 60 million gallons per day (mgd). Secondary facilities are sized to accomodate 32 million gallons per day (mgd), with chlorination facilities capable of handling up to 60 million gallons per day (mgd). The City has submitted final plans to upgrade and expand the existing secondary treatment facilities to 60 million gallons per day (mgd), interim advanced waste treatment facilities, and sludge disposal facilities. The expected construction completion date is August 31, 1977.

The City has a storm water treatment demonstration project under construction soon to be completed, to treat excess combined sewer flows which would otherwise be bypassed before the plant. The existing terminal pond will be used for treatment of these storm flows and at the same time receive the plant effluent until separate terminal ponds are constructed.

The Stream Pollution Control Board has ordered the City of New Haven to abandon its 1.0 million gallons per day (mgd) treatment facility and connect to Fort Wayne. With an anticipated connection of New Haven and the existing inter-connection with Diversified Utilities, a projected interim flow of 38 million gallons per day is expected in the near future. The projected 1980 flow is 43 million gallons per day (mgd).

2. Effluent Limitations First Interim Discharge Serial No. 001

A. The average daily quantity of raw sewage influent to the wastewater treatment facility during the calendar month shall not exceed 38 million gallons per day.

B. During the period beginning on the effective date of this permit and lasting until August 31,1977 , the quality of effluent discharged by the facility shall be limited at all times as follows:

(1) BOD

The arithmetic mean of the five-day Biochemical Oxygen Demand samples collected in a calendar month shall not exceed a concentration of 20 milligrams per liter. The arithmetic mean of these values for effluent samples collected in a calendar week within the calendar month shall not exceed a concentration of 30 milligrams per liter.

ATTACHMENT A

(2) SS

? The arithmetic mean of the suspended solids values for effluent samples collected in a calendar month shall not exceed a concentration of 20 milligrams per liter. The arithmetic mean of these values for effluent samples collected in a calendar week within the calendar month shall not exceed a concentration of 30 milligrams per liter.

(3) pH

The effluent values for pH shall remain within the limits of 6.0 to 9.0.

(4) Fecal Coli

? The geometric mean of the fecal coliform bacteria values for effluent samples collected in a calendar month shall not exceed 200 per 100 milliliters. The geometric mean of these values for effluent samples collected in a calendar week within the calendar month shall not exceed 400 per 100 milliliters.

(5) Phosphorus

The arithmetic mean of the phosphorus values for effluent samples collected in a calendar month shall not exceed a concentration of 1.0 mg/l of elemental phosphorus (P) nor shall the removal be less than 80 percent reduction in the elemental phosphorus (P) content of the wastewater, which ever is more stringent.

C. All discharges from the lime sludge lagoons for the wastewater treatment plant operated by the City shall be discontinued by March 1, 1977.

3. Effluent Limitations

2nd Interim - AWT Terminal Pond (Discharge Serial No. 001)

A. The average daily quantity of effluent discharged from the wastewater treatment facility during a calendar month shall not exceed 60 million gallons per day (mgd) unless the following pollutant loadings to the stream (pounds or kilograms per day) of biochemical oxygen demand and suspended solids are not exceeded.

B. During the period beginning on September 1, 1977 and lasting until December 31, 1978 the quality of effluent discharged by the facility shall be limited at all times as follows:

(1) BOD

The arithmetic mean of the five-day Biochemical Oxygen Demand samples collected in a calendar month shall not exceed a concentration of 15 milligrams per liter or a total quantity (when operating at its rated flow limitation) of 3,408 kilograms per day (7,506 pounds per day). The arithmetic mean of these values for effluent samples collected in a calendar week within the calendar month shall not exceed a concentration of 22.5 milligrams per liter.

(2) SS

The arithmetic mean of the suspended solids values for effluent samples collected in a calendar month shall not exceed a concentration of 15 milligrams per liter or a total quantity (when operating at its rated flow limitation) of 3,408 kilograms per day (7,506 pounds per day). The arithmetic mean of these values for effluent samples collected in a calendar week within the calendar month shall not exceed a concentration of 22.5 milligrams per liter.

(3) pH

The effluent values for pH shall remain within the limits of 6.0 to 9.0.

(4) Fecal Coli

The geometric mean of the fecal coliform bacteria values for effluent samples collected in a calendar month shall not exceed 200 per 100 milliliters. The geometric mean of these values for effluent samples collected in a calendar week within the calendar month shall not exceed 400 per 100 milliliters.

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(5) Phosphorus

The arithmetic mean of the phosphorus values for effluent samples collected in a calendar month shall not exceed a concentration of 1.0 mg/l of elemental phosphorus (P) nor shall the removal rate be less than 80% reduction in the elemental phosphorus (P) content of the wastewater whichever is more stringent.

C. Storm Water Treatment Lagoon Discharges (Discharge Serial Nos 049 and 050)

The effluent discharged from the proposed storm water treatment lagoons, which will treat both combined sewer overflows and storm water overflows, shall be limited at all times as follows:

(1) BOD

The arithmetic mean of the five-day Biochemical Oxygen Demand samples collected in a calendar month shall not exceed a concentration of 15 milligrams per liter. The arithmetic mean of these values for effluent samples collected in a calendar week within the calendar month shall not exceed a concentration of 22.5 milligram per liter.

(2) SS

The arithmetic mean of the suspended solids values for effluent samples collected in a calendar month shall not exceed a concentration of 20 milligrams per liter. The arithmetic mean of these values for effluent samples collected in a calendar week within the calendar month shall not exceed a concentration of 30 milligrams per liter.

(3) pH

The effluent values for pH shall remain within the limits of 6.0 to 9.0.

(4) Fecal Coli

The geometric mean of the fecal coliform bacteria values for effluent samples collected in a calendar month shall not exceed 200 per 100 milliliters. The geometric mean of these values for effluent samples collected in a calendar week within the calendar month shall not exceed 400 per 100 milliliters.

(5) Residual Chlorine

The effluent shall be disinfected on a continuous basis with a chlorine residual maintained at a concentration not to exceed a maximum of 1.0 milligram per liter at the point of discharge.

ATTACHMENT A

4. Implementation Steps and Compliance Schedule

The permittee shall acheive compliance with the effluent limitations for the Interim Advanced Waste Treatment Terminal Pond specified in this attachment in accordance with the following schedule.

IMPLEMENTATION STEPS	COMPLIANCE SCHEDULE Yr.	 Mo.	 Day
Completion of Preliminary Plans	Completed		
Completion of Final Plans	Completed		
Begin Construction	75	3	1
Progress Reports	75	11	1
	76	7	1
	77	3	1
End Construction	77	8	31

Not later than 14 days following each interim date and the final date of compliance, the permittee shall provide the Regional Administrator and the Indiana Stream Pollution Control Board with written notice of the permittee's compliance or noncompliance with the interim or final requirements.

ATTACHMENT A

5. Effluent Limitations and Compliance Schedule for AWT and Ammonia Removal

A. The average daily quantity of effluent discharged from the wastewater treatment facility during a calendar month shall not exceed 60 million gallons per day (mgd) unless the pollutant loadings to the stream (pounds or kilograms per day) of biochemical oxygen demand and suspended solids, shown in Table 1, are not exceeded.

B. During the period beginning on January 1, 1979 and lasting until the expiration date, the quality of effluent shall be limited at all times as follows:

The alternative effluent concentration limitations, shown in Table 1, have been determined to meet the Water Quality Criteria Standards in the Maumee River by the Indiana Stream Pollution Control Board. The various alternatives of effluent Dissolved Oxygen, 5-day biochemical oxygen demand and ammonia nitrogen concentration are approved for discharge dependent upon an acceptable cost effective analysis by the permittee.

(1) BOD

The arithmetic mean of the five-day Biochemical Oxygen Demand samples collected in a calendar month shall not exceed the concentration in milligrams per liter of the alternative selected from Table 1, or a total quantity (kilograms or pounds per day) calculated from the design flow and the effluent concentration limitation of the selected alternative. The arithmetic mean of these values for effluent samples collected in a calendar week within the calendar month shall not exceed a concentration of 150 percent of the monthly limitation.

(2) SS

The arithmetic mean of the suspended solids values for effluent samples collected in a calendar month shall not exceed the concentration in milligrams per liter of the five-day biochemical oxygen demand concentration limitation shown in Table 1 for the alternative selected or a total quantity (kilograms or pounds per day) calculated from the design flow and the effluent concentration limitation of the selected alternative. The arithmetic mean of these values for effluent samples collected in a calendar week within the calendar month shall not exceed a concentration of 150 percent of the monthly limitation.

(3) pH

The effluent values for pH shall remain within the limits of 6.0 to 9.0.

(4) Fecal Coli

The geometric mean of the fecal coliform bacteria values for effluent samples collected in a calendar month shall not exceed 200 per 100 milliliters. The geometric mean of these values for effluent samples collected in a calendar week within the calendar month shall not exceed 400 per 100 milliliters.

(5) Residual Chlorine

The effluent shall be disinfected on a continuous basis with a chlorine residual maintained at a concentration not to exceed a maximum of 1.0 milligram per liter at the point of discharge.

(6) Dissolved Oxygen

The average daily concentration of dissolved oxygen in the effluent shall not be less than the alternative effluent concentration limitation shown in Table 1 for the alternative selected.

(7) Ammonia Nitrogen

The maximum daily concentration of ammonia nitrogen in the effluent shall not exceed the alternative effluent concentration limitation shown in Table 1 for the alternative selected.

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TABLE 1

ALTERNATIVE EFFLUENT CONCENTRATION LIMITATIONS

FOR THE PERIOD JUNE 1 THROUGH AUGUST 31

Alternative	DO-mg/1	BOD_5-mg/1	NH_3-N-mg/1	In Stream NH_3-N-mg/1	In Stream DO-mg/1
1	6.0	10.0	1.1	0.89	5.02
2	6.0	6.7	1.4	1.09	5.05
3	7.0	10.0	1.3	1.04	5.03
4	7.0	6.7	1.7	1.32	4.99
5	8.0	10.0	1.5	1.18	5.03
6	8.0	6.7	1.9	1.46	5.02

FOR THE PERIOD SEPTEMBER 1 THROUGH MAY 31

Alternative	DO-mg/1	BOD_5-mg/1	NH_3-N-mg/1	In Stream NH_3-N-mg/1	In Stream DO-mg/1
1	6.0	10.0	2.1	2.0	4.99
2	6.0	6.7	2.5	2.36	4.99
3	7.0	10.0	2.5	2.30	5.01
4	7.0	6.7	2.6	2.68	5.01
5	8.0	10.0	2.7	2.57	4.99
6	8.0	6.7	3.1	2.94	5.01

DO = Dissolved oxygen
BOD = 5-day biochemical oxygen demand
NH_3 - N = Ammonia Nitrogen

ATTACHMENT A

6. Implementation Steps and Compliance Schedule for AWT & NH_3-N Removal

The permittee shall achieve compliance with the effluent limitations specified in this attachment for advanced waste treatment and ammonia removal in accordance with the following schedule.

IMPLEMENTATION STEPS	COMPLIANCE SCHEDULE		
	Yr.	Mo.	Day
Completion of Preliminary Plans	75	07	01
Completion of Final Plans	76	04	01
Begin Construction	77	01	01
Progress Reports	77 78	09 05	01 01
End Construction	79	01	01

Not later than 14 days following each interim date and the final date of compliance, the permittee shall provide the Regional Administrator and the Indiana Stream Pollution Control Board with written notice of the permittee's compliance or noncompliance with the interim or final requirements.

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7. Facility Operation and Quality Control

All waste collection, control, treatment and disposal facilities shall be operated in a manner consistent with the following:

A. At all times, all facilities shall be operated as efficiently as possible and in a manner which will minimize upsets and discharges of excessive pollutants.

B. The permittee shall provide an adequate operating staff which is duly qualified to carry out the operation, maintenance and testing functions required to insure compliance with the condition of this permit. Indiana Law and Regulation requires that the wastewater treatment facility be under the supervision of a properly certified operator.

C. Maintenance of treatment facilities that results in degradation of effluent quality shall be scheduled during non-critical water quality periods and shall be carried out in a manner approved by the permitting authority.

8. Self-Monitoring and Reporting Requirements

In addition to the preparation and filing of reports of operation required by the State Agency, the following are additional explicit requirements under this permit:

A. The permittee shall effectively monitor the operation and efficiency of all treatment and control facilities and the quantity and quality of the treated discharge. Monitoring data required by this permit shall be summarized on an average calendar month basis. Individual reports for each month are to be submitted on a quarterly basis. Quarterly reports will be required for periods ending on the last day of March, June, September, and December. Original copies of the discharge monitoring report form (EPA Form T-40), properly completed and signed, must be submitted within 28 days after the end of each quarterly report period to the Regional Administrator at the following address:

U. S. Environmental Protection Agency
Region V, Permits Branch
230 South Dearborn Street
Chicago, Illinois 60604

The permittee shall submit two (2) reports to the State Agency every month. The first report will be the Indiana State Board of Health

ATTACHMENT A

monthly reporting form. The second form will be the EPA form T-40. These should be submitted by the 10th of the following month. The address of the State agency is as follows:

Indiana Stream Pollution Control Board
1330 West Michigan Street
Indianapolis, Indiana 46206

The data collected and submitted shall include the following parameters and testing frequencies:

PARAMETER	FREQUENCY	SAMPLE TYPE
Total Flow, mgd	Daily	Continuous
BOD_5, mg/l	Daily	24-hour composite
Suspended Solids, mg/l	Daily	24-hour composite
pH	Daily	Grab
Fecal Coliform, N, per 100 ml	Daily	Grab
Phosphorus, mg/l	Daily	24-hour composite
Dissolved Oxygen, mg/l	3xDaily	Grab
Ammonia Nitrogen, mg/l	Daily	24-hour composite

B. Sampling and Analysis Methods

Effluent values are to be determined by a 24-hour composite sample consisting of a minimum of 4 aliquots composited according to flow, at equally spaced time intervals, during each of 8-hour operator attendance period. For fecal coliform bacteria, a sample consists of one effluent portion collected during a period of maximum flow.

At lease one pH measurement shall be made during each 8-hour operator attendance period.

The analytical and sampling methods used shall conform to 40 CFR, Part 136, dated October 16, 1973, which includes the reference methods listed below. However, different but equivalent methods are allowable if they receive the prior written approval of the permitting authority.

1. Standard Methods for the Examination of Water and Wastewaters, 13th Edition, 1971, American Public Health Association, New York, New York, 10019.

2. A.S.T.M. Standards, Part 23, Water; Atmospheric Analysis, 1972, American Society for Testing and Materials, Philadelphia, Pa., 19103.

3. Methods for Chemical Analysis of Water and Wastes, April 1971, Environmental Protection Agency, Water Quality Office, Analytical Quality Control Laboratory, 1014 Broadway, Cincinnati, Ohio, 45202.

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Beginning on the effective date of this permit and continuing for a period of two years, the following practicable alternative procedures may be substituted for the method of an analysis described in this section:

Effluent Characteristic	Practicable Alternative
Fecal Coliform Bacteria	Residual chlorine within the range of 0.5 to 1.0 milligrams per liter

The permittee shall obtain the required laboratory equipment to analyze the discharge for the parameters indicated or shall arrange for such analysis within six months after the effective date of this permit. The need for wastewater flow measurement must be recognized by the permittee.

The permittee shall take samples and measurements to meet the monitoring requirements at a location representative of the discharge. A chlorine residual analysis must be taken at the effluent end of the chlorine contact tank.

The permittee shall periodically calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at intervals to insure accuracy of measurements.

9. Recording

The permittee shall record for all samples the date and time of sampling, the sampling method used, the date analyses were performed, the identity of the analysis, and the results of all required analyses and measurements.

All sampling and analytical records mentioned in the preceding paragraph shall be retained for a minimum of three years. The permittee shall also retain all original recordings from any continuous monitoring instrumentation, and any calibration and maintenance records, for a minimum of three years. These periods will be extended during the course of any unresolved litigation, or when so requested by the Regional Administrator or the State agency.

10. Solids Disposal

Collected screenings, slurries, sludges, and other solids shall be disposed of in such a manner as to prevent entry of those wastes (or runoff from the wastes) into navigable waters or their tributaries. Such pollutants shall be disposed of by approved methods established by the State agency.

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11. State Agency Construction Permit

Indiana Regulation SPC 15 requires that any modification to a water pollution control facility cannot be made unless a valid construction permit has been issued by the Stream Pollution Control Board of its designated agent. Application for such a construction permit must be made on forms provided by the State Agency 60 days in advance of the date of start of construction.

12. Treatment Facility Expansion

The permittee must recognize that plant expansion or improvement, other than that which may be imposed by this permit, may be required in the future as dictated by domestic and industrial growth. The permittee must plan for such expansion well in advance of the needs so that the conditions of this permit are not violated.

SPECIAL CONDITIONS

MUNICIPAL PERMIT ATTACHMENT

COMBINED SEWER OVERFLOW CONTROL

The permittee is required to initiate a program leading to the attainment of control of overflows from the City's combined sewer system at discharge points Numbers 002 through 052* (as identified below) to assure attainment of the State of Indiana's water quality standards. On or before July 1, 1975, the permittee shall submit to the Permitting Authority and the State Agency a plan for obtaining additional information on the quantity, quality, and impact of combined sewer discharges on the respective receiving waterways, sufficient to develop a subsequent program of control action. If it is determined that the plan is incomplete or inadequate, the plan may be returned to the permittee with the reasons therefore, following which the plan shall be modified by the permittee accordingly and resubmitted within sixty (60) days.

Based on information developed in accordance with the above plan, the permittee shall develop and submit an engineering analysis and a preliminary basis of design for facilities to achieve compliance with the water quality standards of the State of Indiana to the Permitting Authority and the State Agency, for approval thereof, on or before July 1, 1976.

* Except 049 and 050

DISCHARGE NAME	DISCHARGE SERIAL NUMBER
84 " Interceptor Plant Bypass **	002
Glasgow Avenue Regulator	003
Anthony Boulevard Regulator	004
Wayne Pump Co. Regulator	005
Morton Street Lift Station	006
Tecumseh Street Lift Station	007
Coombs Street Regulator	008
Hanna Street Regulator	009
Spy Run Creek Regulator	010
Griswold Drive Lift Station	011
Clinton-Barr Street Regulator	012
Clinton-Superior Street Regulator	013
Clinton-Harrison Street Regulator	014
Third Street Pumping Station	015
Fairmount Regulator	016
Clinton-W. Fairfield Regulator	018
Sherman Street Regulator	019
Clinton-Van Buren Street Regulator	020
Clinton-Jackson Street Regulator	021
Nebraska Street Regulator	022
Thi[illegible] Drive [illegible]	023
Clinton-E. Fairfield Regulator	017

**See note on page 16.

SPECIAL CONDITIONS

MUNICIPAL PERMIT ATTACHMENT

COMBINED SEWER OVERFLOW CONTROL (Cont.)

DISCHARGE NAME	DISCHARGE SERIAL NUMBER
Nelson Street Regulator	024
Rolling Mill Regulator	025
Brown Street Lift Station	026
Pauline Street Regulator	027
Wildwood Avenue Regulator	028
Rudisill Boulevard Regulator	029
Indian Village Regulator	030
Foster Park Regulator	031
Sherwood Terrace Regulator	032
Woodhurst Regulator	033
Westbrook Drive Regulator	034
Terrace Road Regulator	035
Charlotte Avenue Regulator	036
Dalgreen Street Regulator	037
Woodrow Avenue Regulator	038
Anthony Boulevard Regulator	039
Edsall Avenue Regulator	040
Statlers Regulator	041
Harvester Interceptor Regulator	042
Pontiac Street Regulator	043
Warfield Street Regulator	044
Devonshire Drive Lift Station	045
Sludge Lagoon Lift Station	046
Brentwood Regulator	047
Glenwood Park Regulator	048
Parnell Avenue at the St. Joe River	051
Maumee River between the Old City Incinerator and the Old Sludge Lagoons	052

** Flows from the 84" interceptor plant bypass, Discharge Serial Number 002, shall be treated by March 1, 1977.

SPECIAL CONDITIONS

MUNICIPAL PERMIT ATTACHMENT

WHEN INFORMATION ON INDUSTRIAL INPUTS IS INADEQUATE OR INDUSTRIAL EFFLUENT GUIDELINES ARE NOT AVAILABLE

It is apparent that pollutants attributable to inputs from major contributing industries* using the municipal system may be present in the discharge of the treatment facility for which this permit is issued. Based upon information to be developed as a subsequent provision of this Special Condition, this permit may be revised to specify effluent limitations for any or all of such pollutants in accordance with industrial best practicable technology requirements or water quality standards.

The permittee shall develop an Industrial Surveillance Report containing a plan for obtaining information on the quality and quantity of effluents introduced into the municipal sewer system from industrial users, methods proposed to require compliance with Sections 204 (b), 307, and 308 of the Act, and a proposed schedule of implementation of such plan and methods. The permittee shall submit the Report to the Permitting Authority and the State Agency and receive approval thereof on or before July 1, 1975.

The permittee shall report to the Permitting Authority and the State Agency information available for all known major contributing industries on a quarterly basis beginning October 1, 1975. Complete quarterly reporting of all major contributing industries is to be implemented in accordance with the approved Industrial Surveillance Report required by the preceding paragraph. Quarterly reports reflecting no change from the previous quarter may simply relate this fact, without submitting repetitive data.

Based on the information regarding industrial inputs reported by the permittee pursuant to the preceding paragraph, the permittee will be notified by the Permitting Authority of the availability of industrial effluent guidelines on which to calculate allowable inputs of "incompatible pollutants" based on best practicable guidelines which will be provided as appropriate. Not later than 120 days following receipt of such notification, the permittee shall submit to the Permitting Authority and the State Agency calculations reflecting allowable inputs from each major contributing industry. At that time, this permit may be amended to reflect the municipal facility's effluent requirements for "incompatible pollutants." The permittee shall also require all major contributing industries to implement necessary pretreatment requirements (as provided for in 40 CFR Part 128 and submit to the Permitting Authority and the State Agency notification of specific actions taken in this regard.

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*A major contributing industry is one that: (a) has a flow of 50,000 gallons or more per average workday; (b) has a flow greater than five percent of the flow carried by the municipal system receiving the waste; (c) has in its waste a toxic pollutant in toxic amounts as defined in standards issued under Section 307(a) of the Act; or (d) has significant impact, either singly or in combination with other contributing industries, on the treatment works or the quality of its effluent.

SPECIAL CONDITIONS (continued)

The permittee shall require each major contributing industry subject to pretreatment standards or any other applicable requirements promulgated pursuant to Section 307 of the Act to submit to the permittee semi-annual notice regarding specific actions taken to achieve full compliance with the requirements of Section 307. On the first day of the months of July and January, the permittee shall submit to the Permitting Authority and the State Agency a report summarizing the progress of all known major contributing industries subject to the requirements of Section 307 towards full compliance with such requirements. These semi-annual reports must be filed with the Permitting Authority and State Agency until compliance is achieved. Submission would be required again only if a major contributing industry reverts to violating the requirements of Section 307. Such report shall include at least the following information:

(1) A narrative summary of actions taken by the permittee to ensure that all major contributing industries comply with the requirements of Section 307.

(2) The number of major contributing industries using the treatment works, divided into SIC group categories.

(3) The number of major contributing industries in full compliance with the requirements of Section 307, or not subject to these requirements (e.g., discharge compatible pollutants).

(4) A list identifying by name those major contributing industries presently in violation of the requirements of Section 307.

Not later than 180 days following approval of the permittee's plan for obtaining industrial user information and the schedule of implementation, the permittee shall have promulgated an enforceable industrial waste ordinance(s). This ordinance(s) shall allow the permittee to enforce all pretreatment requirements necessary to ensure compliance with the terms and conditions of this permit, as well as to ensure compliance by all major contributing industries with the pretreatment standards and any other applicable requirements promulgated pursuant to Section 307 of the Act. A copy of this ordinance(s) is to be submitted for approval to the Permitting Authority and State Agency such approved ordinance(s) becoming an enforceable provision of this NPDES permit. The ordinance(s) shall require each major contributing industry to submit to the permittee semi-annual notice regarding specific actions taken to achieve full compliance with the requirements of Section 307.

ATTACHMENT B

GENERAL CONDITIONS

1. All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant more frequently than, or at a level in excess of, that identified and authorized by this permit shall constitute a violation of the terms and conditions of this permit. Such a violation may result in the imposition of civil and/or criminal penalties as provided for in Section 309 of the Act. Facility modifications, additions, and/or expansions that increase the plant capacity must be reported to the permitting authority, after having obtained State Agency approval, and this permit then modified or re-issued to reflect such changes. Any anticipated change in the facility discharge, including any new significant industrial discharge or significant changes in the quantity or quality of existing industrial discharges to the treatment system that will result in new or increased discharges of pollutants must be reported to the permitting authority and the State Agency. Modifications to the permit may then be made to reflect any necessary changes in permit conditions, including any necessary effluent limitations for any pollutants, not identified and limited herein. In no case are any new connections, increased flows, or significant changes in influent quality permitted that will cause violation of the effluent limitations specified herein.

2. After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:

   (a) violation of any terms or conditions of this permit;

   (b) obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or,

   (c) a change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge.

3. Notwithstanding 2 above, if a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Act for a toxic pollutant which is present in the discharge authorized herein and such standard or prohibition is more stringent than any limitation upon such pollutant in this permit, this permit shall be revised or modified in accordance with the toxic effluent standard or prohibition and the permittee shall be so notified.

ATTACHMENT B

4. The permittee shall allow the head of the state water pollution control agency, the Regional Administrator, and/or their authorized representatives, upon the presentation of credentials:

   (a) to enter upon the permittee's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this permit;

   (b) to have access to and copy at reasonable times any records required to be kept under the terms and conditions of this permit;

   (c) to inspect at reasonable times any monitoring equipment or monitoring method required in this permit; or,

   (d) to sample at reasonable times any discharge of pollutants.

5. The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, state, or local laws or regulations.

6. This permit does not authorize or approve the construction of any onshore or offshore physical structures or facilities or the undertaking of any work in any navigable waters.

7. Except for data determined to be confidential under Section 308 of the Act, all monitoring reports required by this permit shall be available for public inspection at the offices of the head of the state water pollution control agency and the Regional Administrator. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Act.

8. Any diversion from or by-pass of facilities necessary to maintain compliance with the terms and conditions of this permit is prohibited, except:

   (a) where unavoidable to prevent loss of life, severe property damage, extended duration process upset, or

   (b) where excessive storm drainage or runoff would damage any facilities necessary for compliance with the effluent limitations and prohibitions of this permit.

   The permittee shall promptly notify the permitting authority and the State Agency immediately of such occurrences by telephone and in writing within five days of such diversion or by-pass. Diversions solely caused by rainfall need not be reported except in monthly operation reports submitted to the State Agency.

ATTACHMENT B

9. If for any reason the permittee does not comply with or will be unable to comply with any effluent limitation specified in this permit, or should any unusual or extraordinary discharge of wastes occur from the facilities herein permitted, the permittee shall provide the permit issuing authority and the State Agency with the following information in writing within five days of becoming aware of the condition.

   (a) A description of the non-complying discharge including its impact upon the receiving waters.

   (b) Cause of non-compliance.

   (c) Anticipated time the condition of non-compliance is expected to continue, or if such condition has been corrected, the duration of the period of non-compliance.

   (d) Steps taken by the permittee to reduce and eliminate the non-complying discharge.

   (e) Steps to be taken by the permittee to prevent recurrence of the the condition of non-compliance.

10. Permittee shall take all reasonable steps to minimize any adverse impact to navigable waters resulting from non-compliance with any effluent limitation specified in this permit. The permittee will also provide accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying discharge.

11. In order to maintain compliance with the effluent limitations and prohibitions of this permit, the permittee shall:

   (a) Have or provide an adequate or alternative power source sufficient to operate facilities utilized by permittee to maintain compliance with the effluent limitations and conditions of this permit, or

   (b) Upon the reduction, loss, or failure of the power to facilities utilized by the permittee to maintain compliance with the effluent limitations and conditions of this permit, the permittee shall halt, reduce or otherwise control all discharge in order to maintain compliance with the effluent limitations and conditions of this permit.

Should the treatment facilities not include the above capabilities at the time of permit issuance, the permittee must furnish within 120 days to the permitting authority and the State Agency, for approval, plans for such facilities and an implementation schedule for their installation.

ATTACHMENT B

12. Except as provided in permit condition 8 on by-passing, nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for non-compliance of permit conditions.

13. Nothing in this permit shall be construed to preclude the institution of any legal action nor relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by Section 510 of the Act.

14. In the event of any change in control or ownership of facilities from which the authorized discharges emanate, the permittee shall notify the succeeding owner or controller of the existence of this permit by letter, a copy of which shall be forwarded to the Regional Administrator and the state water pollution control agency.

15. The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

STATE of INDIANA
STREAM POLLUTION CONTROL BOARD

INDIANAPOLIS 46206
1330 West Michigan Street
633-5467

VIA CERTIFIED MAIL
February 10, 1976

Hon. Bob Armstrong
Mayor of Fort Wayne
City-County Building
1 East Main Street
Fort Wayne, Indidna 46802

Dear Mayor Armstrong:

Re: NPDES Permit No. IN 0032191
Modification Application No. IN 0032191-1
Fort Wayne Water Pollution Control Plant
Fort Wayne, Indiana

Your application for modification of the above-referenced discharge permit has been processed in accordance with Sections 402 and 405 of the Federal Water Pollution Control Act Amendments of 1972, (86 Stat. 816, Public Law 92-500, 33 U.S.C. 1251, et. seq.), and IC 1971, 13-7; (the "Environmental Management Act").

The enclosed NPDES Permit Amendment covers your existing NPDES Permit No. IN 0032191. All discharges from the referenced facility shall be consistent with the terms and conditions of this permit, as amended. Note that Indiana Stream Pollution Control Board Regulation SPC 15 requires that any appeal from this determination shall be as found in IC 1971, 4-22-1-1 to 4-22-1-30, must be filed within fifteen (15) days from the effective date stated on the first page of the enclosed amendment.

Very truly yours,

Oral H Hert

Oral H. Hert
Technical Secretary

GPCafouros/1V55/nb
Enclosure
cc: A. H. Manzardo

Permit No. IN0032191

Amendment Application NO. IN0032191-1

INDIANA STREAM POLLUTION CONTROL BOARD

AMENDED AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq.; the "ACT"), and Public Law 100, Acts of 1972, as amended (IC 1971,13-7 et seq.; the "Environmental Management Act"), the National Pollutant Discharge Elimination System (NPDES) discharge Permit No. IN0032191, issued December 30, 1974, to the City of Fort Wayne, Indiana, is hereby amended in accordance with the provisions of Part I hereof.

All terms and conditions of the existing permit not modified by this document will remain in effect. Further, any existing term or condition which this modification will change will remain in effect until any legal restraint to the imposition of this modification has been resolved.

This amendment will become effective on the date of the signature of the Technical Secretary.

This amendment shall expire December 31, 1979.

Signed this 10th day of February, 1976, for the Indiana Stream Pollution Control Board.

Technical Secretary

ATTACHMENT A

EFFLUENT LIMITATIONS, AND MONITORING AND OPERATIONAL REQUIREMENTS

1. Treatment Facility Description

The discharger presently has the following treatment system:

The existing Fort Wayne wastewater treatment facility is a conventional activated sludge (Class IV) plant with effluent chlorination, phosphorus removal facilities and a 2-day terminal holding pond. The plant is capable of providing grit removal, pumping and primary treatment for 60 million gallons per day (mgd). Secondary facilities are sized to accomodate 32 million gallons per day (mgd), with chlorination facilities capable of handling up to 60 million gallons per day (mgd). The City has submitted final plans to upgrade and expand the existing secondary treatment facilities to 60 million gallons per day (mgd), interim advanced waste treatment facilities, and sludge disposal facilities. The expected construction completion date is August 31, 1977.

The City has a storm water treatment demonstration project under construction soon to be completed, to treat excess combined sewer flows which would otherwise be bypassed before the plant. The existing terminal pond will be used for treatment of these storm flows and at the same time receive the plant effluent until separat terminal ponds are constructed.

The Stream Pollution Control Board has ordered the City of New Haven to abandon its 1.0 million gallons per day (mgd) treatment facility and connect to Fort Wayn With an anticipated connection of New Haven and the existing inter-connection with Diversified Utilities, a projected interim flow of 38 million gallons per day is expected in the near future. The projected 1980 flow is 43 million gallons per day (mgd).

2. Effluent Limitations First Interim Discharge Serial No. 001

A. The average daily quantity of raw sewage influent to the wastewater treatment facility during the calendar month shall not exceed 60 mgd through primary treatment nor 38 mgd through secondary treatment.

B. During the period beginning on the effective date of this permit and lasting until February 10,1976 the quality of effluent discharged by the facility shal be limited at all times as follows:

(1) BOD

The arithmetic mean of the five-day Biochemical Oxygen Demand samples collected in a calendar month shall not exceed a concentration of 20 milligrams per liter. The arithmetic mean of these values for effluent samples collected in a calendar week within the calendar month shall not exceed a concentration of 30 milligrams per liter.

ATTACHMENT A

(2) SS

The arithmetic mean of the suspended solids values for effluent samples collected in a calendar month shall not exceed a concentration of 30 milligrams per liter. The arithmetic mean of these values for effluent samples collected in a calendar week within the calendar month shall not exceed a concentration of 45 milligrams per liter.

(3) pH

The effluent values for pH shall remain within the limits of 6.0 to 9.0.

(4) Fecal Coli

The geometric mean of the fecal coliform bacteria volues for effluent samples collected in a calendar month shall not exceed 200 per 100 milliliters. The geometric mean of these values for effluent samples collected in a calendar week within the calendar month shall not exceed 400 per 100 milliliters.

(5) Phosphorus

The arithmetic mean of the phosphorus values for effluent samples collected in a calendar month shall not exceed a concentration of 1.0 mg/l of elemental phosphorus (P) nor shall the removal be less than 80 percent reduction in the elemental phosphorus (P) content of the wastewater, whichever is more stringent.

C. All discharges from the lime sludge lagoons for the wastewater treatment plant operated by the City shall be discontinued by March 1, 1977.

ATTACHMENT A

3. Effluent Limitations

2nd Interim - AWT Terminal Pond (Discharge Serial No. 001)

A. The average daily quantity of effluent discharged from the wastewater treatment facility during a calendar month shall not exceed 60 million gallons per day (MGD) unless the following pollutant loadings to the stream (pounds or kilograms per day) of biochemical oxygen demand and suspended solids are not exceeded.

B. During the period beginning on February 11, 1976, and lasting until December 31, 1978, the quality of effluent discharged by the facility shall be limited at all times as follows:

(1) BOD

The arithmetic mean of the five-day Biochemical Oxygen Demand samples collected in a calendar month shall not exceed a concentration of 15 milligrams per liter or a total quantity (when operating at its rated flow limitation) of 3,408 kilograms per day (7,506 pounds per day). The arithmetic mean of these values for effluent samples collected in a calendar week within the calendar month shall not exceed a concentration of 22.5 milligrams per liter.

(2) SS

The arithmetic mean of the suspended solids values for effluent samples collected in a calendar month shall not exceed a concentration of 15 milligrams per liter or a total quantity (when operating at its rated flow limitation) of 3,408 kilograms per day (7,506 pounds per day). The arithmetic mean of these values for effluent samples collected in a calendar week within the calendar month shall not exceed a concentration of 22.5 milligrams per liter.

(3) pH

The effluent values for pH shall remain within the limits of 6.0 to 9.0

(4) Fecal Coli

The geometric mean of the fecal coliform bacteria values for effluent samples collected in a calendar month shall not exceed 200 per 100 milliliters. The geometric mean of these values for effluent samples collected in a calendar week within the calendar month shall not exceed 400 per 100 milliliters.

(5) Phosphorus

The arithmetic mean of the phosphorus values for effluent samples collected in a calendar month shall not exceed a concentration of 1.0 mg/l of elemental phosphorus (P) nor shall the removal rate be less than 80% reduction in the elemental phosphorus (P) content of the wastewater whichever is more stringent.

C. Storm Water Treatment Lagoon Discharges (Discharge Serial Nos 049 and 050)

The effluent discharged fromthe proposed storm water treatment lagoons, which will treat both combined sewer overflows and storm water overflows, shall be limited at all times as follows:

(1) BOD

The arithmetic mean of the five-day Biochemical Oxygen Demand samples collected in a calendar month shall not exceed a concentration of 20 milligrams per liter. The arithmetic mean of these values for effluent samples collected in a calendar week within the calendar month shall not exceed a concentration of 30 milligram per liter.

(2) SS

The arithmetic mean of the suspended solids values for effluent samples collected in a calendar month shall not exceed a concentration of 20 milligrams per liter. The arithmetic mean of these values for effluent samples collected in a calendar week within the calendar month shall not exceed a concentration of 30 milligrams per liter.

(3) pH

The effluent values for pH shall remain within the limits of 6.0 to 9.0.

(4) Fecal Coli

The geometric mean of the fecal coliform bacteria values for effluent samples collected in a calendar month shall not exceed 200 per 100 milliliters. The geometric mean of these values for effluent samples collected in a calendar week within the calendar month shall not exceed 400 per 100 milliliters.

(5) Residual Chlorine

The effluent shall be disinfected on a continuous basis with a chlorine residual maintained at a concentration not to exceed a maximum of 1.0 milligram per liter at the point of discharge.

ATTACHMENT A

7. Facility Operation and Quality Control

All waste collection, control, treatment and disposal facilities shall be operated in a manner consistent with the following:

A. At all times, all facilities shall be operated as efficiently as possible and in a manner which will minimize upsets and discharges of excessive pollutants.

B. The permittee shall provide an adequate operation staff which is duly qualified to carry out the operation, maintenance and testing functions required to insure compliance with the condition of this permit. Indiana Law and Regulation requires that the wastewater treatment facility be under the supervision of a properly certified operator.

C. Maintenance of treatment facilities that results in degradation of effluent quality shall be scheduled during non-critical water quality periods and shall be carried out in a manner approved by the permitting authority.

8. Self-Monitoring and Reporting Requirements

A. The permittee shall submit effluent monitoring reports (SPC-15 Form B) to the State Agency every month in addition to the regular State Board of Health operational report or approved alternative report. Report forms will be supplied by State Agency. Both report forms should be submitted by the 28th of the following month. The address to which the reports should be mailed is as follows:

Municipal Wastewater Section
Division of Water Pollution Control
Indiana State Board of Health
1330 W. Michigan Street
Indianapolis, Indiana 46206

The data collected and submitted shall include the following parameters and testing frequencies:

PARAMETER	FREQUENCY	SAMPLE TYPE
Total flow, mgd	daily	Continuous
BOD_5, mg/l	daily	24-hr. composite
Suspended Solids, mg/l	daily	24-hr. composite
pH	daily	grab
Fecal Coliform, N, per 100 ml	daily	grab
Phosphorus, mg/l	daily	24-hr. composite
Dissolved Oxygen, mg/l	3xdaily	grab
Ammonia Nitrogen, mg/l	daily	24-hr. composite

B. Sampling and Analysis Methods

Effluent values are to be determined by a 24-hour composite sample consisting of a minimum of 4 aliquots composited according to flow, at equally spaced time intervals, during each of 8-hour operator attendance period. For fecal coliform bacteria, a sample consists of one effluent portion collected during a period of maximum flow.

At lease one pH measurement shall be made during each 8-hour operator attendance period.

The analytical and sampling methods used shall conform to 40 CFR, Part 136, dated October 16, 1973, which includes the reference methods listed below. However, different but equivalent methods are allowable if they receive the prior written approval of the permitting authority.

1. Standard Methods for the Examination of Water and Wastewaters, 13th Edition, 1971, American Public Health Association, New York, New York, 10019.

2. A.S.T.M. Standards, Part 23, Water; Atmospheric Analysis, 1972, American Society for Testing and Materials, Philadelphia, Pa., 19103.

3. Methods for Chemical Analysis of Water and Wastes, April 1971, Environmental Protection Agency, Water Quality Office, Analytical Quality Control Laboratory, 1014 Broadway, Cincinnati, Ohio 45202.

APPENDIX B

FINAL REPORT OF PROTOTYPE AND PILOT-SCALE STUDIES

APPENDIX B

FINAL REPORT OF PROTOTYPE AND PILOT-SCALE STUDIES

INTRODUCTION

The preliminary studies of the various wastewater treatment processes which were considered to be potentially applicable for advanced waste treatment and ammonia-nitrogen control at Fort Wayne, Indiana, led to the conclusion that more specific data than was available would be required for final process selection. This was particularly true with respect to the ammonia-nitrogen treatment requirement, and stemmed from a lack of sufficient design and operating history data for such facilities generally similar to the Fort Wayne system.

The preliminary feasibility and cost analyses indicated that the required reduction of organic carbon biochemical oxygen demand (BOD_5) and ammonia-nitrogen could be achieved at least cost in a single reactor ("single stage nitrification") using the existing activated sludge facilities. However, there were several uncertainties and unknowns regarding technical applicability which prevented the confident selection of this process without testing it for this specific case. The initial studies also indicated that a substantial portion of the influent ammonia load was contained in the anaerobic digestion supernatant, and suggested that separate treatment of this relatively low volume stream might be necessary to assure success of the main ammonia-nitrogen treatment process.

Similarly, the preliminary studies showed that the use of the existing terminal ponds for removal of the residual suspended solids and BOD_5 escaping from the secondary treatment and/or ammonia-nitrogen removal process would be much less costly than any other alternative, but that technical process success could not be reliably predicted on the basis of the available information.

The preliminary cost estimates indicated a savings of several million dollars of either single stage nitrification or terminal pond tertiary treatment, or both, could be selected. It was concluded, therefore, that an extensive process testing program was warranted and justified on both technical and cost grounds.

These detailed studies were conducted at the Fort Wayne Water Pollution Control Plant from October, 1975 to April, 1976. Interim reports describing the plans, progress, and preliminary findings of the studies were submitted in July and October of 1975, and February, 1976.

The principal objective of this testing program was to resolve the following questions:

1. Can the existing activated sludge process units be operated to provide both carbon oxidation and nitrification of ammonia, and, if so what structural or equipment modification will be required to provide this capability at the design rate of 60 MGD?
2. Can the existing terminal ponds, as they exist or with modifications, be made to provide adequate tertiary treatment in con junction with a nitrification process to meet the final NPDES Permit effluent limitations?
3. Can the anaerobic digestion supernatant be successfully nitrified on a rotating biological contactor, and is such treatment necessary to assure satisfactory overall ammonia-nitrogen control?

GENERAL METHODOLOGY

Two full-scale prototype processes and two pilot-scale systems were investigated. These were (a) a 20 gpm single stage activated sludge nitrification pilot system, (b) a prototype single stage nitrification process employing a portion of the existing full-scale activated sludge facilities, (c) a prototype pond operation employing the recently constructed Pond No. 3, and (d) a pilot-scale rotating biological contactor for anaerobic supernatant nitrification.

Overall planning and direction of the studies was provided by the Engineer and the Plant Superintendent, and daily operational control was shared by the plant personnel and the Engineer's resident representative. All laboratory analyses were performed in the plant laboratory by the regular staff, and were conducted in accordance with Standard Methods for the Examination of Water and Wastewater.

Throughout the duration of the on-site testing work, "desk studies" were continued in the office using the intermediate findings of the tests as well as various reports and publications of other pertinent work that became available during that period.

SINGLE STAGE ACTIVATED SLUDGE NITRIFICATION

Theoretical Development of Test Conditions

The basis for the determination of the desired test system operating conditions was developed from basic biokinetic theory and an extensive review of the literature. The publication last fall of the Process Design Manual for Nitrogen Control by the EPA Technology Transfer Office presented an opportunity to check the earlier conclusions. This Manual provides an excellent compilation and interpretation of the nitrification literature and presents a sequential procedure for the design of a new nitrification plant. Using the known sizes of the Fort Wayne activated sludge system, process influent characteristics, and effluent requirements, the design calculation sequence was reversed to determine the theoretical conditions necessary to produce the required effluent ammonia-nitrogen concentration. These calculations are summarized in the following paragraphs. Notation is defined in Table B/3.

To determine the appropriate kinetic model:

$$\frac{S_o}{N_o} = \frac{140 \text{ mg/l}}{24 \text{ mg/l}} = 5.84$$

Since S_o/N_o is > 5.0, the system is classified as a combined carbon oxidation-nitrification (i.e., single stage) process.

Axial dispersion number (D/uL)

$D = 3.118\ \omega^2 A^{0.346}$

west plant: $\omega = 35$, $A = 27.5$

$D = 12{,}020\ \text{ft}^2/\text{hr}$

$u = 95.5\ \text{ft/hr}$ @ 50% recycle

$L = 520\ \text{ft}$

$$\frac{D}{uL} = 0.242$$

east plant: $\omega = 30$, $A = 38.0$

$D = 9{,}850\ \text{ft}^2/\text{hr}$

$u = 122$ ft/hr @ 50% recycle

$L = 480$ ft

$$\frac{D}{uL} = 0.168$$

Since $\frac{D}{uL}$ for both systems is approximately 0.2, the plug flow kinetic model applies.

The basic design parameter for biological waste treatment is the biological solids retention time, denoted as θ_c^d, and also identified as SRT or sludge age.

$$\frac{1}{\theta_c^d} = Y_b q_b - K_d \qquad (1)$$

For a system with Y_b and K_d fixed, θ_c^d may be controlled only by controlling q_b, the substrate utilization rate.

$$q_b = \frac{S_o - S_1}{HX_1} \qquad (2)$$

If, as in Fort Wayne, the values of H, S_o, and S_1 are fixed, q_b (and therefore θ_c^d) can be varied only by varying X_1, the mixed liquor volatile suspended solids (MLVSS).

Equating the expressions for q_b from equations (1) and (2) and solving for X_1 yields

$$X_1 = \frac{\theta_c^d\ Y_b\ (S_o - S_1)}{H\ (\theta_c^d K_d + 1)} \qquad (3)$$

Using equations (1) and (3) with the following values, Table B/1 was developed for varying conditions:

$Y_b = 0.60$

$K_d = 0.05\ \text{day}^{-1}$

$S_o = 140$ mg/1

$S_1 = 5$ mg/1

H = 0.342 day (west plant)

H = 0.246 day (east plant)

TABLE B/1

MLVSS REQUIRED FOR VARIOUS θ_c^d VALUES

θ_c^d (days)	q_b (1b BOD/1b VSS/day)	X_1 (mg/1) East	X_1 (mg/1) West
30	0.139	3950	2840
27.5	0.144		
25	0.150	3660	2630
22.5	0.157		
20	0.167	3300	2370
17.5	0.178		
15	0.194	2820	2030
12.5	0.217		
10	0.250	2200	1580
7.5	0.305		
5	0.417	1320	950
2.5	0.750		

The foregoing calculations pertain to the kinetic parameters for the heterotrophic (carbon oxidizing) organisms, since they are predominant in the MLVSS. For the given conditions, the autotrophic (nitrifying) organisms comprise only about four percent of the MLVSS.

To be successful in nitrifying, the system must be operated such that θ_c^d is greater than the minimum allowable autotrophic solids retention time to prevent washout. This minimum value is denoted as θ_c^m:

$$\theta_c^m = \frac{1}{\dot{\mu}_N}$$

where $\dot{\mu}_N$ is the maximum possible autotrophic growth rate under the prevailing conditions of temperature, pH, and dissolved oxygen concentration.

$$\dot{\mu}_N = \hat{\mu}_N \left[\frac{DO}{DO+K_{O_2}}\right]\left[1-0.833(7.2-pH)\right]$$

For pH $\geqslant$ 7.2, the pH term is equal to one.

Assuming a minimum mixed liquor DO of 2.0 mg/l and a K_{O_2} of 0.5 mg/l:

$$\dot{\mu}_N = 0.80\ \hat{\mu}_N \qquad (4)$$

where $$\hat{\mu}_N = 0.47e^{0.098\ (T-15)} \qquad (5)$$

$$\frac{1}{\theta_c^d} = \frac{\dot{\mu}_N\ (N_o-N_1)}{(N_o-N_1)+K_N \ell n \frac{N_o}{N_1}} \qquad (6)$$

where $$K_N = 10^{0.051T-1.158} \qquad (7)$$

Using equations (4), (5), and (7), Table B/2 was developed for varying temperatures:

TABLE B/2

KINETIC CONSTANTS AT VARIOUS TEMPERATURES

T		$\hat{\mu}_N$	$\mathring{\mu}_N$	K_N	θ_c^m
°C	°F	day^{-1}	day^{-1}	mg/l	days
5	41	0.18	0.144	0.125	6.95
10	50	0.29	0.232	0.225	4.32
15	59	0.47	0.376	0.405	2.66
20	68	0.77	0.616	0.728	1.63
25	77	1.25	1.00	1.31	1.00

From equation (6) using the above values of $\mathring{\mu}_N$ and K_N, and N_o = 24 mg/l:

At 5°C, for N_1 = 2.1 mg/l

θ_c^d = 9.2 days

θ_c^d/θ_c^m = 1.3

At 25°C, for N_1 = 1.1 mg/l

θ_c^d = 1.52 days

θ_c^d/θ_c^m = 1.5

Referring back to Table B/1, it can be seen that it should be a relatively easy task to achieve θ_c^d values of 1.5 to 9.2 days. As indicated in the EPA Process Design Manual, however, higher safety factors (i.e., higher θ_c^d/θ_c^m values) are desirable. The prototype and pilot plant operations attempted to operate with θ_c^d values of 8 to 16 days.

Reviewing the foregoing analysis, it can be seen that the values assumed for Y_b, K_d, DO, and K_{O_2} strongly affect the determination of an operating MLVSS to achieve a desired θ_c^d. Further, the kinetic model is based on constant S_o, S_1, N_o, and N_1, and presumes the absence of any toxicity effects and sufficient influent alkalinity to absorb the loss due to nitrification.

Since there is some degree of uncertainty of known variance in all of these assumptions, the protogype and pilot scale studies were necessary to verify the theoretical conclusions of the model. The principal reason for employing both prototype and pilot scale systems in the study was the need to examine a number of cominations of θ_c^d, H, and X_1 in a limited time.

TABLE B/3

NOTATION

Symbol	Definition
A	air flow per unit of tank volume, standard cu ft per min per 1000 cu ft
D	axial dispersion coefficient, sq ft/hr
DO	dissolved oxygen, mg/l
H	hydraulic detention time
K_d	"decay" coefficient, day^{-1}
K_N	half saturation constant for oxidation of ammonia nitrogen, mg/l
K_{O_2}	half saturation constant for oxygen, mg/l
L	tank length, ft
MLVSS	mixed liquor volatile suspended solids, mg/l
N_o	TKN in the influent, mg/l
N_1	NH_4^+-N in the effluent, mg/l
q_b	rate of substrate removal, lb BOD (or COD) removed/lb VSS/day
S_o	influent total BOD (or COD), mg/l

TABLE B/3 - (Cont.)

Symbol	Definition
S_1	effluent soluble BOD (or COD), mg/1
T	temperature, degrees C
TKN	Total Kjeldahl Nitrogen
u	mean displacement velocity, ft per hr
ω	aeration tank width, ft
X_1	MLVSS, mg/1
Y_b	heterotrophic yield coefficient, lb VSS grown per lb of substrate removed
θ_c^d	solids retention time of design, days
θ_c^m	minimum solids retention time, days, for nitrification at given pH, T and DO
$\hat{\mu}_N$	peak Nitrosomonas growth rate, day^{-1}
$\dot{\mu}_N$	maximum possible nitrifier growth rate under environmental conditions of T, pH and DO, and $N \gg K_N$

Pilot Scale System

Mechanical repairs and revisions to the existing 20 gpm pilot plant were completed in mid-November, and the system was seeded with activated sludge from the full-scale prototype unit. Nitrification was established by early December and the system appeared to be approaching stability although process loading control proved to be difficult. A frame and plywood enclosure was constructed around the system below the tops of the tanks (which are steel structures set on grade) to protect it from cold weather. A reinforced polyethylene cover about 10 mil thick was erected over the top of the tanks to conserve heat.

In early January high winds ripped off the polyethylene cover and dislocated the air connection to the return sludge line during the night, causing a complete loss of the mixed liquor. Two weeks later, after the system had been repaired, power for the pilot plant feed pump was interrupted by construction activity near the aeration control building and not restored until the following morning. The pilot plant feed line froze and attempts to thaw it proved unsuccessful. The two-inch plastic portion of the line did thaw when the temperature reached 34°F, but the four-inch cast iron section remained frozen. The pump was restarted to direct the relatively warmer primary effluent against the ice in the four-inch pipe in a final attempt to thaw the line. On February 9 the pump failed due to leakage around the motor seals.

It was estimated that it would take until mid March to return the pilot plant to service, and then several days would be required to get the system seeded, stabilized, and again ready to produce useful data. Since this would have left very little time to collect valid data, this phase of the program was terminated.

Prototype System

The prototype system was one-fifth of the existing 32 MGD activated sludge facilities. It consisted of the No. 4 aeration tank and the No. 4 clarifier. Primary effluent enters the two-pass aeration tank through a 48-inch sluice gate. Each pass is 260' long by 35' wide by 16' water depth for a total volume of 2.18 million gallons. Air is applied to the aeration tank up to the design capacity of 4,200 CFM. The mixed liquor flows to the 110' diameter No. 4 clarifier through a 36-inch cast iron pipe. Sludge is returned from the clarifier through a 16-inch pipe connected directly to the bottom of a 16-inch sirlift pump. The rated design capacity of the airlift pump was 3.2 MGD when new. Its actual present capacity is uncertain.

The return sludge flow rate is measured with a venturi tube. Exact measurement of this flow rate is hampered by air bubbles that become entrained in the sludge during the airlift pumping operation. This creates a problem in determining the flow rate during operation and the actual capacity of the airlift pump. The effluent flow rate from the clarifier is measured with a sharp crested weir in the effluent channel.

Air flow to the system is monitored in the aeration control building where readings are taken hourly by the aeration operators. A venturi insert nozzle is the primary measuring element with differential pressure readings transmitted to the aeration building control panel.

Before this study was undertaken, there was no method of measuring the activated sludge wasted from the No. 4 return sludge line. The waste activated sludge discharged into a concrete box that emptied into the plant drain line. During the course of the study a 90° v-notch weir was positioned in the concrete box. A Manning dipper probe was used in conjunction with the weir to measure flows up to 200,000 gpd.

The present plant expansion will alter the metering system and the air delivery pattern to unit No. 4. The coarse diffusers will be spaced to provide tapered aeration. The return sludge and waste sludge flow rates will be measured with magnetic flow meters. New orifices will be installed to measure the air flow rate to the aeration tank. All measurements will be transmitted to the control processor located in an improved main control room.

Prototype Operating Results

Table B/4 presents the weekly average values of the several parameters describing the operation and results of the prototype test. It must be noted that the metering of waste and return sludge volumes was not highly accurate, and, therefore, caution will be necessary in using the values given in Table B/4 for design purposes.

Review of Table B/4 shows that for the major portion of the study the system performed quite well and that the single stage nitrification process is applicable for the Fort Wayne plant.

The plan for prototype operation was carried out by the Water Pollution Control Plant Superintendent. He combined the plan with his judgment and expertise in an attempt to maintain satisfactory overall plant performance and to keep the effluent suspended solids and biochemical oxygen demand concentrations within current effluent limitations. At times, this

TABLE B/4

CITY OF FORT WAYNE, INDIANA

PROTOTYPE ACTIVATED SLUDGE SINGLE STAGE NITRIFICATION WEEKLY AVERAGE OPERATING DATA AND RESULTS

Week Starting	Q (MGD)	Q_R (%)	H (hrs)	MLVSS (mg/l)	BOD_5 (mg/l)		SS (mg/l)		VSS (mg/l)		NH_4^+-N (mg/l)		NO_3-N (mg/l)		q_b (day^{-1})	θ_c^d (days)
					Infl.	Effl.	Infl.	Effl.	Infl.	Effl.	Infl.	Effl.	Infl.	Effl.		
10/06/75	4.61	52	11.3	2137	119	7	371	19	129	10	15.7	0.37	0.39	12.9	0.114	
10/13/75	4.16	51	12.6	2577	122	10	306	19	149	11	19.6	0.20	0.33	9.9	0.086	
10/20/75	4.26	49	12.3	3035	99	8	240	19	86	9	14.6	0.33	0.23	8.7	0.060	
10/27/75	3.93	50	13.3	2753	109	5	238	14	89	5	15.7	0.25	0.04	15.6	0.069	
11/03/75	4.82	39	10.9	3101	101	4	146	9	83	5	13.8	0.17	0.07	13.2	0.070	
11/10/75	4.48	38	11.7	3182	111	8	124	28	75	25	14.1	0.31	0.04	8.8	0.068	
11/17/75	4.30	36	12.2	2926	118	6	141	22	62	14	15.3	0.30	0	8.0	0.077	
11/24/75	4.13	38	12.7	2755	111	12	198	70	142	44	10.6	0.13	0.88	11.0	0.071	
12/01/75	4.88	32	10.7	2301	100	7	131	28	82	22	13.6	0.19	1.80	9.6	0.094	
12/08/75	4.51	33	11.6	2665	97	3	139	8	68	5	17.1	0.19	1.04	8.2	0.074	
12/15/75	4.45	34	11.8	2765	81	7	121	26	82	20	12.9	0.20	1.74	9.7	0.057	
12/22/75	4.89	32	10.7	2355	96	4	102	15	132	20	17.1	0.28	0.26	12.2	0.089	
12/29/75	4.98	30	10.5	2446	92	7	107	29	77	28	15.1	0.20	1.02	9.8	0.082	12.1
01/05/76	5.59	28	9.4	2321	122	4	146	15	110	10	20.8	0.29	0.90	11.2	0.131	7.5

TABLE B/4 (Cont.)

CITY OF FORT WAYNE, INDIANA

PROTOTYPE ACTIVATED SLUDGE SINGLE STAGE NITRIFICATION
WEEKLY AVERAGE OPERATING DATA AND RESULTS

Week Starting	Q (MGD)	Q_R (%)	H (hrs)	MLVSS (mg/1)	BOD_5 (mg/1) Infl.	BOD_5 (mg/1) Effl.	SS (mg/1) Infl.	SS (mg/1) Effl.	VSS (mg/1) Infl.	VSS (mg/1) Effl.	NH_4^+-N (mg/1) Infl.	NH_4^+-N (mg/1) Effl.	NO_3-N (mg/1) Infl.	NO_3-N (mg/1) Effl.	q_b (day^{-1})	θ_c^d (days)
01/12/76	6.18	25	8.4	2133	98	8	167	17	112	10	20.3	0.96	0.63	9.2	0.124	4.4
01/19/76	6.48	24	8.1	2050	120	20	155	64	114	65	19.2	2.38	0.71	5.6	0.159	6.0
01/26/76	5.48	29	9.6	2371	110	11	157	21	111	10	20.8	1.00	1.04	9.2	0.110	11.1
02/02/76	5.14	30	10.2	2520	113	13	155	23	145	23	23.0	1.61	0.79	9.0	0.098	11.5
02/09/76	5.37	30	9.8	2697	63	8	141	30	106	27	10.6	0.77	2.06	7.9	0.052	10.1
02/16/76	5.74	33	9.1	2305	31	11	240	33	90	26	7.2	0.90	3.75	6.2	0.025	11.2
02/23/76	5.64	34	9.3	2741	97	13	191	19	128	13	11.9	0.74	3.0	7.0	0.162	10.0
03/01/76	6.34	33	8.3	2403	66	10	171	12	85	9	9.2	1.9	2.4	6.0	0.067	8.8
03/08/76	5.25	42	10.0	2678	76	12	172	45	91	28	14.2	3.8	1.7	5.0	0.057	29
03/15/76	4.43	49	11.8	2769	94	11	223	42	164	7	16.7	9.2	0.4	1.5	0.061	21
03/22/76	4.54	46	11.5	2826	111	7	267	14	135	7	17.0	6.5	0.5	3.8	0.077	6.9
03/29/76	4.73	45	11.1	3065	106	9	317	22	158	18	17.0	4.2	0.6	4.3	0.068	5.5
04/05/76	5.11	43	10.2	2943	145	8	323	15	141	7	20.2	2.9	0.4	5.2	0.109	4.6
04/12/76	5.98	39	8.7	2871	172	13	475	18	219	12	20.5	8.1	0.2	3.0	0.152	2.7

required wasting activated sludge in large quantities to prevent the solids in a rising sludge blanket from escaping into the effluent. A direct result of this was the wide fluctuation in the weekly average solids retention time, θ_c^d, shown in Table B/4.

It is known that a slug wasting procedure can cause shifts in the microbial population ratios. This is extremely important in a combined carbon-nitrogen oxidation system where the nitrifier/heterotroph ratio is only approximately 0.05. A sudden loss of a large fraction of the organisms from the system will cause sharp decrease in the effective solids retention time and may result in nitrifier washout.

An assessment of the significant loss of nitrification after March 8, 1976 should be made. From March 1, 1976 through March 5, 1976 a very large amount of sludge was wasted from the prototype unit. The average effluent ammonia concentration, NH_4^+-N, rose to 3.8 mg/l during the next week and to 9.2 mg/l the following week. The system did not fully recover for the remainder of the test period. Three hypotheses can be proposed to explain this situation: (1) the solids retention time was not held high enough to maintain or to permit reestablishment of the nitrifying population, (2) a concurrent reduction in the air supply caused the available D.O. to become a limiting nutrient, or (3) the introduction of dredged material from the bottom of Pond No. 1 created an environment inhibiting the nitrifiers.

Regarding hypotheses (1), the current Water Pollution Control Plant expansion will include the installation of new meters for recording waste and return activated sludge flow rates. It is anticipated that through a more accurate measure of these parameters, along with a daily analysis of the total and volatile suspended solids in these streams, the solids retention time, θ_c^d, will be more easily monitored and controlled.

Considering the second hypothesis, although an increase of air blower capacity is to be provided in the current construction project, it has been calculated that the intended increase will not be sufficient to handle diurnal fluctuations in TKN loads. Additional blower capacity should be provided as a part of this advanced waste treatment project.

The potential toxic effect of heavy metals and other dredged substances could not be definitively assessed. A grab analysis of the dredged material from the bottom of Pond No. 1 indicated that it contained high concentrations of iron, aluminum, zinc, and chromium. The data are lacking to determine if the observed concentrations, even when diluted 30:1, could have had an inhibitory effect on the nitrifiers. It may ultimately be found necessary to exercise close control over future routine pond dredging operations. Additional study of this potential problem will be warranted when the plant is in full nitrifying operation.

Other major points noted from review of the prototype operating results were:

1. The assumed value of 0.5 for K_{O_2} is apparently too low. Although it could not be precisely calculated, a value of 1.0 appears more characteristic of the system.
2. Due principally to the previously discussed inability to accurately measure waste sludge volume, it was not possible to quantify the values of Y_b and K_d for the single stage nitrification system.

3. As an observation more qualitative than quantitative, the single stage nitrificationprocess is more sensitive and prone to upset than conventional activated sludge, and will require very close operator attention as the system loading approaches the design condition.

TERMINAL POND EVLUATION

Terminal Pond No. 3 was filled with secondary effluent and its discharge was monitored through the months of March and April. The effluent was analyzed for pH, suspended solids, BOD_5, dissolved oxygen, fecal coliform, and ammonia-nitrogen. The results for those analyses and the secondary effluent analyses during the same period are presented in Table B/5. The results of the BOD_5 and suspended solids removal by the pond cannot be taken at face value for two reasons. First, the pond was not monitored during the summer months when algal blooms may contribute heavily to increased suspended solids and BOD_5 in the pond effluent. Second, a substantial anaerobic "bottom layer" of sediments probably had not been bulit up in only two months, and the pond probably was not operating in a true facultative mode.

To more adequately assess the probable performance of Pond No. 3, the four year operating history of the existing Pond No. 1 was reviewed in detail. A preliminary report currently in preparation for the Stormwater Demonstration Project evaluated the performance of Pond No. 1 before, during and after the construction of the combined sewer stormwater overflow screening facility. This report states that the BOD_5 and suspended solids removal efficiency of Pond No. 1 decreased statistically at lower influent loading rates. If the entire Fort Wayne Water Pollution Control Plant is to be operated at a higher solids detention time, the BOD_5 and SS loading rate to Pond No. 3 may be substantially lower than during the March-April testing period. The conclusion to be drawn from this is that the predicted future efficiency should be somewhat less than that shown in Table B/5.

TABLE B/5

POND NO. 3 ANALYSIS FOR MARCH AND APRIL, 1975

Pond No. 3 Effluent

	pH	SS (mg/l)	BOD_5 (mg/l)	D.O. (mg/l)	Fecal (#/100 ml)	NH_3-N (mg/l)
Avg.	7.7	9	6	10.0	0	10.9
Max.	8.0	33	15	12.0	0	15.2
Min.	7.3	1	2	8.1	0	4.0

Secondary Effluent

	pH	SS (mg/l)	BOD_5 (mg/l)	D.O. (mg/l)	Fecal (#/100 ml)	NH_3-N (mg/l)
Avg.	7.5	18	20	5.8	0	-
Max.	7.7	52	122	8.7	0	-
Min.	7.0	2	2	2.8	0	-

DIGESTER SUPERNATE NITRIFICATION

The Autotrol RBC unit arrived at the Fort Wayne Water Pollution Control Plant on March 9, 1976. Within a week, it was placed in the basement of the digester control building. Filled with supernate from Digester #2 that had been diluted 2:1 with the plant's secondary effluent, the unit was operated in a batch-fill mode for almost a month.

On or about April 14, 1976, a sufficient amount of biomass had grown on the plastic media. A continuous feed system was established to test the ammonia removal efficiency of the biomass. However, a dredging operation associated with the plant expansion loaded the digesters with an abnormally high amount of sludge. The quality of the supernate changed drastically. The Engineer felt that it was no longer representative of the influent to the proposed full-scale digester supernate nitrification facility. The work on this phase of the study was postponed until the digester supernate reaches a more representative quality.

Conclusions. The major conclusions derived from the testing program are as follows:

1. The single stage activated sludge nitrification process is feasible for use at Fort Wayne. At the design condition of 60 MGD the process will require more air than is currently available, making it necessary to provide additional blower capacity. It appears that the existing return sludge pumping capacity will have to be increased, but this conclusion is not definite due to the imprecision of the existing metering equipment.

   The process will require very close operating attention, particularly as the applied load approaches the plant design capacity. Due to the sensitivity of the nitrifying biological culture to changes in operating conditions, diligent monitoring and control of the process will be necessary to maintain continuously satisfactory treatment.

   The prototype operating results exhibited periodic instability and a tendency toward process upset by rather abrupt changes in process loading or operating conditions. Since it is improbable that even the best operation can always counter this type of occurrence in municipal wastewater treatment, and since the NPDES Permit does not allow any substantial or extended deviation from the effluent ammonia-nitrogen limitations, it is considered prudent to provide an auxiliary system to reduce effluent ammonia on an "as required" basis. The breakpoint chlorination process is considered most feasible for this purpose.

2. Terminal ponds have not been demonstrated to be able to meet the final effluent limitations when used as the sole advanced waste treatment process in conjunction with single stage nitrification at the full design load. The single stage process effluent suspended solids concentrations were too great to be fully confident of reliable reduction to less than 10 mg/l by ponds on a continuous, steady-state basis. It was concluded that a more positive, controllable process should follow single stage nitrification for removal of residual BOD_5 and suspended solids.

   Analysis of dry weather period data for Pond No. 1 since it went into service in October, 1972, and extensive review of reported pond performance at other locations indicates that a one or two pond system may provide satisfactory final treatment following a stable nitrification process. This process arrangement was not tested, however, and the conclusion cannot be documented. Moreover, review of Pond No. 1 effluent data reveals that the effluent quality in June, July, and August is normally poorer than the annual average value. This is significant in that the NPDES Permit limitations are stricter during these summer months than in the balance of the year, and the potential for water quality degradation is somewhat greater in this period due to low flow conditions in the river.

3. The nitrification of anaerobic digester supernatant with rotating biological contactors appears to be a feasible process. This conclusion is drawn primarily from the results reported by the Chicago Metropolitan Sanitary District. The pilot-scale unit at Fort Wayne has provided little data as yet due to a late

start in the test. The unit is still on site, and tests will continue for a few weeks to collect confirming data. It has been concluded, however, that this treatment should not be necessary to meet the final effluent limitations, and it will not be proposed for inclusion with this project. The process may find application in the future if inordinate difficulty is encountered with single stage nitrification at the design condition.

APPENDIX C

A REPORT
TO THE
CITY OF FORT WAYNE
REGARDING
A PROPOSED PLAN OF IMPLEMENTATION
OF AMMONIA REMOVAL AND
EFFLUENT POLISHING AT THE
WATER POLLUTION CONTROL PLANT

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Purpose

The draft Facility Plan Second Amendment dated May, 1976 has been reviewed by the State Agency and the U. S. Environmental Protection Agency. These governmental agencies have expressed the view that the cost-effective analysis presented therein meets the substantial requirements of the applicable grant regulations. The alternatives discussed in the subject document were assessed on a cost-effective basis considering the implementation steps and compliance schedule of the present NPDES permit. These implementation steps are sufficiently out-of-date to warrant consideration of a NPDES permit modification to amend the time schedule for implementation of the cost-effective alternative.

The purpose of this report is to reassess the time of implementation of these alternatives while considering the cost of achieving ultimate goals of meeting the Water Quality Criteria of the State of Indiana at the earliest possible date. The plan for implementing those steps to meet the Water Quality Criteria proposed herein includes application of "Best Practicable Technology" in the short term (until 1981-82). A step-by-step approach is proposed to meet the statutory requirements for "Best Available Treatment" by 1983.

Background

The program for advanced waste treatment at the City of Fort Wayne was initially outlined in the Lake Erie Report, published in 1968.[1] This document formulated the basis for treatment of known point sources of nutrient materials known to accelerate the eutrophication in the Great Lakes basin. The City of Fort Wayne responded to the statement of the goals of this report by providing treatment for combined sewer overflows and tertiary ponding of sewage treatment plant effluent as early as 1971. The addition of interim phosphorus removal by chemical precipitation in 1973 began another phase of intergovernmental cooperation to bring the City into compliance with the expressed purpose of the Report.

Subsequent studies and reports have followed up on the beginnings made pursuant to the Lake Erie Report. The Waste Load Allocation Study[2] performed for the Upper Maumee River near Fort Wayne, defined more specifically the goals required of the City. This study had as its objectives to:

> "...determine the actual loadings from dischargers, maximum permissible loadings, and waste load allocations for the Maumee River in the Fort Wayne area".[2]

The City applied for, and was granted, an NPDES permit dated December 30, 1974, which provided for interim AWT terminal ponding of the discharge from the City's Wastewater Treatment facility, the Water Pollution Control Plant until December 31, 1978. This permit further stipulated that:

> "The alternative effluent concentration limitations, shown in Table I, have been determined to meet the Water Quality Criteria in the Maumee River by the Indiana Stream Pollution Control Board. The various alternatives of effluent Dissolved Oxygen, 5-day Biochemical Oxygen Demand, and Ammonia Nitrogen concentration are approved for discharge dependent on an acceptable cost-effective analysis by the permittee".[3]

Subsequent to the issuance of this NPDES permit, the Facility Plan Second Amendment pilot study work was accomplished under Federal Grant C 180774-01. This pilot work was undertaken to demonstrate the feasibility of single-stage carbonaceous plus nitrogenous oxygen demand reduction using the existing aeration basins at the Plant and to evaluate the use of the existing terminal ponds for removal of residual suspended solids and five-day biochemical oxygen demand (BOD_5) and/or nitrogen removal to meet the final NPDES permit limitations.[4]

This work has been completed and a report submitted to the reviewing authority. Several points have been raised by the Owner and the reviewing authority concerning the conclusions stated in the subject Facility Plan amendments. In meetings between the staff of the Stream Pollution Control Board and the City of Fort Wayne, it was agreed that the City of Fort Wayne would prepare a written statement regarding the necessity of several changes needed in the NPDES permit cited to carry out the objectives of the amended Facility Plan. This present document represents the best judgment of the Engineer regarding the implementation of the amended Facility Plan as requested by the staff of the State Agency.

Statement of the Problem Areas

The main points that can be made regarding the implementation schedule are:

1. The available stream monitoring data compiled by the City going back to 1971 show the Waste Load Allocation Report assumption of K_n (20°C) = 0.6 day^{-1} more restrictive than necessary to meet the Water Quality Criteria.
2. The operation of the expanded improved activated sludge plant at Fort Wayne in a single-stage nitrification mode will permit the maintenance of the water quality standards on the Maumee River by the use of the new Terminal Pond No. 3 as a tertiary treatment device for the next three to five years.
3. The addition of the requisite hardware for the implementation of the single-stage nitrification mode of treatment at Fort Wayne will be possible by Change Order to the present Step 3 construction grant.
4. Considering these points, the City intends to proceed on a step-by-step basis implementing those changes required to meet the water quality standards in the nearest possible time frame while taking advantage of the savings represented by incorporating necessary work under the present construction grant C 180538-01.

Waste Load Allocation Report[2] and the NPDES Permit[3]

The survey on which the Waste Load Allocation Report was based (known as WLAS hereinafter) was conducted from July 31 through August 3, and August 20 through August 23, 1973 by EPA personnel. Stream flow measurements were made on the major tributary streams and samples were taken at ten points along the Maumee River which were analyzed for chemical constituents and bacteriological contamination. The results of these seven days were taken as the basis for the maximum permissible loadings based on annual 7-day once in ten-year low flows in the stream in the reach surveyed, although the report states:

> "...flows during the survey .... were far in excess of the annual 7-day, once in ten-year low flow."[2]

The City of Fort Wayne has been sampling the Maumee River periodically at several of the same points used in the WLAS by the EPA sampling team since 1971. These data were supplied to the State Agency in September, 1976. There were several periods where the stream flow closely approached the critical condition of the 7-day, once in ten-year low flow (38 MGD). Specifically, the months of September, 1972, September, October and November, 1973, and July, August, September, and October, 1974 had periods where the stream flow was less than three times the average daily plant flow for at least one day.[5]

A long-term trend analysis of stream water quality was undertaken in the Fort Wayne Stormwater Demonstration Grant project report.[6] In this work, stream dissolved oxygen levels were shown to average 7.5 mg/1 in

a typical year during low stream flows. After the Stormwater Facility began receiving combined sewer overflows and Water Pollution Control Plant storm-caused bypass overflows in 1975, significant improvements in stream water quality resulted throughout 1975 and 1976. In the pre-construction period of evaluation, WPCP downstream dissolved oxygen was recorded less than 4.0 mg/1 a total of 81 days in 629 days surveyed (12.9 percent). Data further downstream showed an even more pronounced trend of low stream D.O. Stream D.O. was measured at less than 4.0 mg/1 135 days in 653 days surveyed (20.7 percent). Several of the samples were taken at flow conditions approaching the 7 day, 10-year low flow and are considered to be very representative of the low flow periods in the river.

After the completion of the Stormwater Facility in late 1974, the stream D.O. took a noticeable turn for the better. Only 7 days in 239 surveyed (2.9 percent) were recorded throughout 1975 where the stream dissolved oxygen at New Haven (4-1/2 miles downstream from the WPCP) was less than 4.0 mg/1 and the minimum value recorded was only 3.8 mg/1.[6]

The 1976 data presented in the above report[5] represent nine days when the river dissolved oxygen was less than 4.0 mg/1 at New Haven. The lowest value observed was 2.2 mg/1 in September, 1976. The average stream D.O. for 1976 to date is 7.68 mg/1, which is comparable to the annual average of the stream D.O. in all other years for which data are available.

These points are brought up to express the contention that the stream sampling data obtained by the City over the past four years represent a more rational data base on which to calibrate a stream water quality

model when compared to the brief sampling survey of seven days duration conducted by EPA in 1973. The plant data show the necessary range and trends required to properly assess the kinetic coefficients in any such model.

The plan data do not confirm the nitrogenous oxygen decay rate coefficient, K_n(20°C) which was assumed to be 0.6 day^{-1} in the WLAS.[2] Rather, a lower K_n is indicated over the longer term of stream sampling and a K_n of 0.4 day^{-1} could be used in place of 0.6 day^{-1}. This assumed K_n of 0.4 day^{-1} will also meet the stream water quality standard of 5.0 mg/l D.O., based on an analysis of the sources and sinks of stream D.O. used in the WLAS report. Therefore, it would seem that the maximum permissible loadings for ammonia nitrogen could be revised upwards somewhat while still maintaining the stream model dissolved oxygen in the range required.

Another assumption in the Waste Load Allocation Survey Report affects the limitations used in the NPDES permit. An ultimate carbonaceous biochemical oxygen demand to five day biochemical oxygen demand ratio of 2.05 was assumed in the WLAS whereas a ratio of 1.50 was assumed in the NPDES permit.[2,3] The difference between the two ratios is significant because the ratio essentially determines the permissible effluent BOD_5 that the plant will be permitted to discharge to meet a carbonaceous oxygen demand loading.

To resolve the question, City personnel have recently begun several 30-day BOD samples of the terminal pond effluent to attempt to verify the CBOD to BOD_5 ratio one way or the other. At least six more samples will

be required to validate the relationship statistically. These samples include data from colder weather months as well as the warmer months. This data gathering effort should run until mid-February, 1977.

The WLAS dissolved oxygen deficit equation cited[2] contains no term specifically accounting for effluent suspended solids from any of the point sources considered. Rather, the contribution of suspended solids to dissolved oxygen budget calculations is included in the ultimate carbonaceous oxygen demand term (based on total CBOD, not soluble), the estimated benthal sludge deposits term, and the various oxygen demanding materials decay coefficients (all of which are based on total BOD, not soluble). However, the NPDES permit contains a statement which ties the value of plant effluent suspended solids to the numerical value of the BOD_5 determined from the Maximum Permissible Loading. This situation represents the most stringent condition possible concerning the plant effluent. It implies that the best estimate of the total ultimate CBOD is given by both BOD_5 and suspended solids as though there were some empirical relationship between the two. In fact BOD_5 is and of itself the best estimate of the ultimate CBOD. By knowing the CBOD to BOD_5 ratio, the ultimate CBOD may be calculated from BOD_5 data.

Tertiary Ponding as a Cost-Effective AWT Process for Plant Effluent Polishing

Most of the available literature reviewed tends to support the view that ponding of secondary treatment plant effluents offer an economical means of effluent polishing when the effluent water quality requirements are seasonally adjusted for algal problems.[7,8] One plant, located at Indian Creek, Johnson County, Kansas[9], utilized a two-day terminal pond to polish the effluent from a trickling filter plant before discharge to the receiving waters. Plant operating data was reported in the paper cited and later in the Second International Symposium for Waste Treatment Lagoons at Kansas City, Missouri.[10]

The authors of the paper reported at the University of Kansas conference in 1964 made the point that the secondary treatment process BOD_5 is not likely to have a rapid oxygen uptake to the same degree as the raw wastewater would likely have.[9] This situation results from the high degree of oxidation of soluble organic material in the aerobic treatment of the wastewater. Most of the total BOD_5 entering the terminal pond represents organic material contributed by the degradation of volatile suspended solids remaining in the secondary sedimentation process effluent. From a carbon loading standpoint, very little of this remaining BOD_5 represents the raw BOD_5 entering the treatment plant.

This tertiary pond shows a reasonably consistent set of effluent quality parameters over a full cycle of operating experience. The monthly mean values for effluent BOD_5 and suspended solids ranged from 9-17 mg/l and 7-14 mg/l respectively. During the warm weather months the effluent from this pond averaged 13 mg/l BOD_5 and 14 mg/l suspended solids.[10]

Another plant, Peoria, Illinois, was faced with a high per capita loading of organic matter chose to upgrade the existing plant through process modifications to the activated sludge plant and the addition of tertiary ponds receiving secondary effluent, combined sewer overflow bypass, and primary effluent. Experience with ponds over a ten-year period when treating secondary effluent only showed that this method of tertiary treatment met the treatment efficiency standards of the State of Illinois required of this plant.[20] Treatment efficiency ranged from 40 to 60 percent based on pond loadings of BOD and suspended solids over the first five years of operation.[21] The ponds were reportedly abandoned to make available space needed for nitrification facilities. Some of the pond area was refurbished to provide temporary storage for combined sewer overflows.[22]

These two successful examples of tertiary ponds being used to polish secondary effluents are consistent with the experience at Fort Wayne over the past four years. The treatment plant has been operating at a sludge age of 10 to 12 days and treats around 32 MGD average daily flow with a minimum of secondary treatment. The readily available soluble organic matter in the Water Pollution Control Plant Secondary effluent is normally less than 2 - 5 milligrams per liter at steady state. Pond removal of secondary effluent suspended solids and the associated BOD_5 has resulted in pond treatment efficiency of 50 to 90 percent on the average.[6] The present plant expansion will improve the treatment of the plant to secondary treatment for all raw sewage flows pumped. This will remove some 90 to 95 percent of soluble organic materials present in the raw sewage in secondary treatment. All of the remaining soluble organic matter available to biological degradation will be converted

in the pond to new bacteriological cell mass within the available hydraulic detention time in the pond. This process of soluble substrate removal follows the kinetics of endogeneous respiration of microorganisms and is predictable.[8] Because of the small quantity of soluble organic matter available for new cell synthesis, this oxygen demand will be met strictly by pond water surface reaeration rates.

If the plant were operated in single-stage nitrification during the effective dates of the second interim AWT standard for the plant effluent, the sludge age in secondary treatment would be at least 10 to 12 days all the time.[4] This would mean the secondary effluent would generally have a residual soluble BOD_5 less than 5 mg/l BOD_5 most of the time. When the secondary treatment process is producing a highly nitrified effluent, the ammonia nitrogen in the effluent will be very low. There is some speculation that the ammonia nitrogen in the pond influent may become the limiting substrate for the algae in the pond. Golueke et al. cites the critical value required to sustain an active symbiotic population of heterotrophic bacteria and autotrophic algae in a pond to be in the range of 12 to 16 mg/l as ammonia nitrogen for high rate oxidation ponds treating domestic wastes.[11]

McKinney, on the other hand, argues that for each mole of algae cell mass synthesized, one mole of ammonia nitrogen and 5.7 moles of carbon dioxide are required.[7] In order for the pond to operate in steady state, there must be 2 pounds of carbon dioxide produced in situ to generate each pound of algal cell mass. Considering the Water Pollution Control Plant will be operating at a very high efficiency with

respect to carbonaceous BOD removal, the amount of carbon dioxide needed must come from secondary effluent bicarbonate alkalinity, biological respiration, or anaerobic decomposition of benthic solids. Testing in the prototype scale pilot work[4] under this program established the residual alkalinity after nitrification will be well in excess of that needed to sustain a substantial algae population.

The bulk of the literature reviewed by McKinney[7] tends to show higher effluent suspended solids in summer than in winter. This is consistent with operational data from the terminal pond at Fort Wayne. The average monthly data in 1975 show pond suspended solids at an average 13 mg/l year round with the months of May, June, July, August and September averaging 17.2 mg/l while the rest of the year averaged only 10.3 mg/l.[12] The effluent BOD_5 for this same period also shows a five-month average of 12.4 mg/l as compared to a 10 mg/l annual average. The seven colder months averaged 9.0 mg/l as BOD_5.[12]

It should be noted that these results reflect operation of the plant in the conventional activated sludge mode with primary effluent in excess of 32 MGD sent to the terminal pond directly. The experience with impounding only secondary effluent at Terminal Pond No. 3 during the two-month process evaluation resulted in a higher quality effluent than the average for Pond No. 1 during the Stormwater Demo Grant. Terminal pond No. 3 consistently provided an average effluent BOD_5 and suspended solids of 6.0 mg/l and 9.0 mg/l, respectively.[4]

Using a revised maximum permissible loading constraint of a total oxygen demand based on a $K_n = 0.4\ \text{day}^{-1}$ and CBOD to BOD_5 ratio of 2.05, the

prototype scale work shows the plant effluent can meet an effluent concentration standard of 2.0 mg/l NH_4-N 75 percent of the time. This corresponds to 3,070 pounds of NOD at 40 MGD, which would allow a discharge of not more than 4,600 pounds CBOD, or 13.8 mg/l CBOD. This would correspond to an effluent BOD_5 of 6.7 mg/l BOD_5. This condition is judged to be the most critical cold weather condition because of the rate dependence of nitrification with respect to temperature.

Under the same set of assumptions, the plant effluent can meet a standard of 1.0 mg/l NH_4-N 67 percent of the time. A carbonaceous oxygen demand of 9800 pounds CBOD per day corresponds to an effluent BOD_5 concentration of 14.33 mg/l BOD_5 at a plant treatment flow of 40 MGD.

The peaks in daily ammonia concentration have been analyzed for relationships among flow, BOD_5 concentration and loading, and other treatment plant variables. There was no statistically relevant relationship between the treatment plant flow or any other loading or concentration parameter demonstrable at any level of significance except for the treatment plant influent and effluent relationship (85 percent confidence level). Furthermore, the daily composited ammonia concentrations obtained in the years that the plant has been compiling these data show a distribution of concentrations that may be best described as random. Few cases were noted where the results of the preceding sampling period corresponded even remotely to the results of the following.

From this, it is concluded that the plant influent ammonia concentration varies as an independent variable from day to day. As such, the

corresponding effluent ammonia also varies from day to day. With the terminal pond acting as a concentration equalization device, the ability to absorb perturbations in secondary effluent ammonia caused by nitrification process upset conditions, peak concentrations in WPCP, or other reasons is judged to be adequate. However, there may be times when the effluent ammonia may "spike" to values greater than 1.5 mg/l as NH_4-N during the summer months. These conditions will result from short-term plant process upset conditions that can be adequately handled as soon as flow routing and concentration equalization strategies can be implemented. Lacking reliable and efficient instrumentation to detect high ammonia levels in the nitrification process effluent, the operators will have to sample the aeration effluent every few hours to know whether the process has gone into upset or deficient performance. This condition can be handled if the operators have the time to reroute the effluent flow to another terminal pond for long-term holding and/or blending with low-ammonia effluent, and to break-point chlorinate at the Water Pollution Control Plant. Otherwise, some of the peak effluent ammonia may pass to the river unnitrified until the operators can correct the operating deficiency. This condition would be true of virtually any nitrification process stream without adequate flow and concentration equalization of raw wastes to dampen short-term ammonia daily peaks.

A weekly average ammonia of 1.5 mg/l with a daily composite not to exceed 3.0 mg/l can be easily met. At a typical warm weather pond effluent pH of 7.7 and a temperature of 24°C (75°F), this corresponds to an un-ionized ammonia concentration of 0.075 mg/l as (NH_3).[13] This corresponds to approximately one-tenth of the median 168 hour mortality of adult rainbow trout at a pH of 7.84 and D.O. of 4.0 - 8.8 mg/l and one-thirtieth the median 168 hour mortality at pH 7.84 and D.O. of 5.2 to 9.4 mg/l for perch.[14]

With a terminal pond effluent that is continuously reaerated to a dissolved oxygen concentration of at least 6.0 mg/l, the conditions in the stream should be perfectly adequate to protect the most sensitive indigenous specie present at Fort Wayne. The proposed daily standard of 3.0 mg/l can be met virtually all the time by in-plant process control techniques and effluent blending when process upset conditions require some form of additional ammonia removal.

Some effort has been devoted to the investigation of algae and the impact of algal-laden wastewaters on water quality (considering the number of literature citations available on the subject). There are several points to consider when discussing the effect of algae on the receiving water.

First, the presence of algae in water samples incubated in the dark may affect the biochemical oxygen demand of the sample in one of two ways:

1. by direct addition of volatile suspended solids capable of being decomposed by facultative microorganisms, adding to the bottle BOD,

2. by respiration of live algal cells, utilizing dissolved oxygen and resulting in an added apparent BOD.[8]

Incubation of a BOD sample in the light would tend to stimulate algal activity based on photosynthesis. This would result in a net increase in D.O. which could result in a negative BOD value.

McKinney makes the point that the dark bottle BOD test does not adequately assess the impact of the algae grown on the receiving stream. He goes on to say:

> "Unfortunately, there is no easy way to evaluate the impact of the oxidation pond effluents except to examine the receiving stream".[7]

King et al. cite the detrimental effects of algae sedimentation on stream water quality. The long-term BOD was five times the BOD_5, although there is some evidence that nitrification made up a portion of the long-term BOD data.[15]

Wisniewski presented some data which showed a shift in algal populations from the mouth of the Fox River near Lake Winnebago, Wisconsin to the sampling points downstream. In this study, the usual lake algae gradually disappeared and other species took over with increasing distance from the lake.[16]

Bartsch commented on this situation by observing:

> "...the algae reaching the river originated in a different type of habitat, are less suited for existence in the river, and die off downstream".[17]

Later writings from Bartsch express a similar theme:

> "As (the algae) are swept along downstream, some of them continue to contribute oxygen through photosynthesis, others die off in such a pattern that algal respiration is replaced only gradually the more rapid use of oxygen as the algae decay."[18]

McDonnell et al. analyzed the discharge from a lagoon to a Pennsylvania Creek and showed the D.O. profiles in the receiving waters were more-or-less independent of the BOD concentrations of the lagoon effluent. Stream D.O. was demonstrated to be more influenced by stream flow and water temperature than BOD in the treatment plant effluent. The conclusion drawn by the researchers here was to go with the relatively greater effect of removal of effluent ammonia and phosphorus rather than the BOD_5.[19]

Golueke et al. made the point that nitrogen concentration may be limiting in tertiary ponds, inasmuch as the other necessary chemical constituents may be present in excess whereas the nitrogen concentration may support only a few mg of algae per liter in the pond. This situation would presumably result in less algae in the effluent to contribute to its BOD.[11]

The point can be made that the absence of benthal deposits in the downstream reaches of the Maumee surveyed in the WLAS tend to support the contention that the few parts of suspended solids in the terminal pond effluent have not settled out in the stream in the past several years.

When sludge banks were noted on the upper reaches of the Maumee years ago, these sludge banks were attributed to combined sewer and storm-sewer overflows and lime sludge discharge. Continued operation of the waste treatment plant terminal ponds will not contribute anywhere near significant quantities of sediments. The stream has been described as:

> "The Maumee River, generally silt-laden,... results in high concentrations of pollutants along the western shore (of Lake Erie)."[1]

This same report goes on to designate the Maumee River as the greatest contributor of rural runoff pollution, amounting to an estimated two million tons per year of silt from soil erosion.[1] The Water Pollution Control Plant, with an average discharge of 800 tons of suspended solids throughout 1975, pales in comparison to this huge loading. Furthermore, the Lake Erie Report recognized the impact of the rural runoff sedimentation problem by making the point:

> "It is not likely that the rate of silt input from rural runoff will increase by any significant amount in the future... (The present rate (appears to be) less than it has been in the past".)[1]

The participants at the Lake Erie Conference in 1965 cited the silts and sediments entering the lake as a major problem because these sediments were enriched with nutrients that were released in the lake. Goals were set in the subsequent 1968 report to establish secondary treatment as the minimum level of treatment for all municipal wastes.

This report designated the City of Fort Wayne as a municipality whose secondary treatment capabilities must be augmented. Year-round disinfection and provision of adequate dilution water or installation of advanced waste treatment were needed to comply with the interstate water quality standards, according to this report.[1]

The City installed interim phosphorus removal facilities, expanded the secondary treatment facilities to treat the total raw sewage pumping capacity, chlorinated the entire plant flow year-round, and began treating combined sewer overflows and plant bypass wastewaters by screening, disinfection, and ponding. The City is proposing to begin plant scale nitrification following the present construction program, followed by terminal ponding to implement the recommendations of the Lake Erie Commission. These facilities should meet the interstate water quality standards for the Maumee River through 1981 or 1982 based on anticipated plant hydraulic, organic, and nitrogen loadings. Beyond this time period, the loadings are anticipated to increase beyond the present capability of the designated terminal pond. Additional treatment in the form of Best Available Treatment (i.e., dual media gravity filters) is proposed as the most cost-effective means for meeting the future loadings of the plant. Even beyond 1982, these filters will be designed to be operated intermittently when the terminal pond capability to reduce the effluent biochemical oxygen demand will be insufficient to meet the NPDES permit conditions due to the increased oxygen demanding materials load on the plant.

Conclusions:

A. The present NPDES permit must be revised:

1. The present revised permit limitations for the Stormwater Treatment Pond effluent points (Discharge Serial 049 and 050) should be revised:

   a. The present permit requires continuous disinfection of the effluent when the expressed purpose of these ponds is to prechlorinate stormwater and combined sewer overflows that are pumped to the ponds for treatment. There are no pond effluent chlorination points installed at Fort Wayne, only pond influent chlorination points.

   b. These stormwater ponds discharge authorizations should reflect the intermittent nature of the operation of these facilities (required only when the plant bypass and combined sewer overflows are diverted to the Stormwater Treatment Station).

   c. These discharges will not come at a time when the stream flow is at the 7-day, once in ten years low flow that is the basis of the present State Water Quality Criteria. Some dispensation should be permitted the Stormwater ponds to allow discharge of disinfected, impounded combined sewer overflows to the River during higher stream flow conditions.

   d. The designated use of Terminal Pond No. 2 as a dual use pond capable of receiving stormwater flows from Pond No.

1, as well as chlorinated secondary effluent from the Chlorine Contact Tank, is not adequately reflected in the present modified Permit Discharge Point 050 will be necessary as an alternate interim terminal pond effluent discharge point when Terminal Pond No. 3 is down for dredging and/or other service work.

2. The Final Effluent Limitations and Compliance Schedule for the AWT and ammonia nitrogen removal schedule must be revised:
    a. The Facility Plan amendments have not been formally approved by the reviewing authority and the design of the ammonia removal and effluent polishing facilities is awaiting approval of the Revised Project Schedule for AWT implementation.

3. The alternate effluent concentrations limitations (Table I, Attachment A) of the present NPDES permit should be revised:
    a. The present permit contains an ambiguity regarding the selection of the particular alternate effluent concentration limitations listed. The WLAS says the specific CBOD and NOD load combinations listed therein (which corresponds to Table I, Attachment A of the NPDES Permit) are examples of possible allocation schemes for the Water Pollution Control Plant. (In other words, the WLAS implies there may be other possible combinations of CBOD and NOD loadings that will meet the total ultimate oxygen demand). The NPDES permit requires the permittee to make a choice

among the alternatives noted "based upon an acceptable cost-effective analysis". All of these alternatives are possible using single stage nitrification, breakpoint chlorination, effluent blending and/or effluent reaeration to saturation D.O. Therefore, the choice of one alternative over another is basically an operational decision. This decision will normally be made based on the observed plant performance on a given combination of raw waste influent and process operating conditions. The operational decisions that will comply with the alternatives in Table I, Attachment A, must be made on a case-by-case basis at the time. For all of these reasons, the point can be made that the intent of the Permit conditions will be met by choosing any one of the alternate effluent limits on a day-by-day basis.

b. The stream water quality data on which the WLAS study was based shows the nitrogenous oxygen demand decay coefficient could be represented by a K_n (20°C) of 0.4 to 0.6 day^{-1}. The K_n (20°C) was arbitrarily selected at 0.6 day^{-1}. Subsequent analysis of the long-term stream D.O. data obtained by the City shows K_n (20°C) as 0.4 day^{-1} fits the actual stream data as well. The D.O. deficit model should be revised to include this $K_n = 0.4\ day^{-1}$ since this term is critical to determine the plant effluent CBOD allowable within the constraints of the model.

c. The D.O. deficit model in the WLAS on which the NPDES permit was based does not contain a term to account for the effluent suspended solids. The term for the CBOD already includes the effluent suspended solids BOD. The present NPDES permit requirement for suspended solids not to exceed the BOD_5 concentrations given in Table I, Attachment A, is unnecessarily restrictive and constitutes a tacit requirement for Best Available Treatment when Best Practicable Treatment will suffice to meet the Water Quality Criteria. Secondary effluent standards for suspended solids (30 mg/l based on a calendar monthly average) will suffice as long as the BOD_5 alternative selected meets the effluent limitations stated.

d. The effluent daily ammonia requirement will be extremely difficult to control because the ammonia loading to the plant can change drastically without warning. The process options selected provide for the maximum operational flexibility based on the nitrogenous oxygen demand of this influent source. Furthermore, the daily effluent ammonia nitrogen restriction is inconsistent with the assumption of the WLAS in which the nitrogenous oxygen demand is best estimated by the ammonia nitrogen concentration integrated over time. The CBOD concentration is handled similarly by the model, and yet the CBOD allocation is

based on a long-term average (monthly) loading, not a daily loading as is the NOD allocation. A design loading, "peaking factor", is necessary for plant CBOD loadings whereas the ammonia peak concentration must be used in design of the nitrification process facilities. This will unnecessarily complicate the operation of the plant.

e. The terms of the present Permit do not take into account the flow dilution capacity of the receiving stream at more normal flow ranges than the 7 day, once in ten years low flow criterion would represent. This consideration is critical to the effluent limitations of the stormwater ponds and relevant to the limitations of the plant effluent. The WLAS model is based on the low flow conditions and represents a "worst case" analysis. The daily effluent allowable loading for ammonia will not exceed the instream ammonia concentration for flows greater than this low flow unless the upstream concentration violates the assumptions used in the model. Therefore, a daily instream ammonia limitation represents a redundant requirement without force and effect and should be deleted from Table I, Attachment A.

B. The water quality objectives of the Maumee River can be met earlier than the time frame anticipated in the present Implementation Steps and Compliance Schedule in Attachment A of the present NPDES permit without the construction of the dual media gravity filters:

1. By installation of the necessary hardware for implementation of single-stage nitrification at the Water Pollution Control

Plant, the Plant can meet the water quality standards based on high efficiency removal of carbonaceous plus nitrogenous oxygen demanding materials at the plant.

2. The process modifications required include:
    - a. One additional 22,000 SCFM aeration blower.
    - b. Additional return sludge pumping capacity to the existing aeration tanks.
    - c. An additional sludge pumping station to convey the terminal pond dredgings directly to the sludge lagoons.
    - d. Polymer plus coagulant additions at primary and secondary settling tanks for high efficiency solids removal.
    - e. New aeration headers in Aeration Tanks Nos. 4 and 5 and other piping and equipment modifications to increase aeration system efficiency.
    - f. Terminal Ponds effluent reaeration capability to bring the effluent D.O. to near saturation year-round.
    - g. Incidental electrical, structural, and mechanical work to complete the installation.
    - h. Additional process testing and analysis equipment and supplies to monitor plant treatment operations on-line.
3. These process modifications will be completed in 1977-1978, resulting in an earlier date for completion and compliance with the permit conditions.
4. Labor and material cost increases attributable to inflation will be saved the grantee and the grantor.

5. The capability of operation of a full-scale nitrification plant over a complete cycle of variation in raw plant flow and concentration will be possible to assess design changes required in the installation of Best Available Treatment by 1983.
6. Plant operational flexibility will be preserved by keeping Terminal Pond No. 2 available for receiving poor quality effluent to be stored and treated whereas Pond No. 1 will remain on-stream to handle storm flows whenever required.

C. Best Available Treatment goals will be met by the statutory deadline while the Plant is treating the entire flow for ammonia and phosphorus removal to comply with the present Water Quality Criteria.

1. BPT for Fort Wayne will be the single-stage nitrification plus terminal ponding until 1982 or 1983.
2. Around 1982 terminal ponding drops out as BPT anyway because the stormwater ponds No.1 and No.2 will be loaded more heavily and additional area for ponding nitrified plant effluent would be required thereafter.
3. Gravity dual media filters are BAT for Fort Wayne for BOD_5 and Suspended Solids removal.
4. Operational and predesign data obtained at the Plant for BAT will be available by the time the filters must be designed to meet these objectives.

Recommendations

A. The City of Fort Wayne should begin the following sequence immediately.

1. Submit an NPDES Permit Modification Request immediately to revise the plan of implementation contained in the present Permit.
    a. This Permit Modification Request should address the intermittent discharge of the stormwater treatment ponds, the effluent chlorination points at the plant, the alternate effluent limitations question, and request a new effluent alternatives limitations table to reflect a more realistic value for the nitrogenous oxygen demand decay coefficient, K_n, as well as the flow dilution capability of the stream.
2. Authorize the preparation of plans and specifications for the proposed process modifications to implement single stage nitrification under this present construction program. These plans and specifications will be necessary to obtain bid prices from the contractor for the purchase and/or installation of the process equipment needed.
3. Prepare a Step 2 application for a Federal grant to design the process equipment required to meet the statutory goal of Best Available Treatment by 1983.
4. Schedule a public hearing on the amendments to the Facility Plan to implement BPT immediately and BAT within five years.

B. The City should continue the present plant expansion work simultaneously to the preparation, design, and installation of the proposed process modifications for single-stage nitrification.

1. The present contract for Division I work should be extended to July, 1978 to incorporate the anticipated process modification work.

2. Anticipated start-up of the nitrification process units is July, 1978.
3. The City should commence the full scale treatment evaluation of single-stage nitrification by September, 1978.

C. The City should submit an application for research, development and demonstration grant funds for the evaluation of full scale single-stage nitrification plus effluent terminal ponding as tertiary treatment by January 31, 1977.

D. The City should authorize the commencement of the Step 2 design of the Best Available Treatment process units within 30 days after receipt of a Step 2 grant award.

REFERENCES

1. Lake Erie Report. U. S. Water Quality Administration, Washington, D.C. U. S. Department of Interior, August, 1968.

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3. NPDES Permit No. IN0032191 dated December 30, 1974 as amended February 10, 1976.

4. "Facilities Plan for Wastewater Treatment Facilities - Second Amendment - Advanced Wastewater Treatment Facilities", prepared by Henry B. Steeg & Associates, Division of Howard Needles Tammen & Bergendoff, Indianapolis, Indiana, May 1976.

5. "Maumee River Sampling Survey - 1972-1976". A Report on Stream Water Quality compiled by Paul L. Brunner, Superintendent, Water Pollution Control Plant, City of Fort Wayne, Indiana.

6. "Combined Sewer Overflow Treatment by Screening and Terminal Ponding at Fort Wayne, Indiana", a Report prepared for the U. S. Environmental Protection Agency in fulfillment of Federal Grant No. 11020 GYU by Delmar H. Prah and Paul L. Brunner, May, 1976.

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9. "Water Quality Implications of a Tertiary Aerobic Lagoon" by Raymond C. Loehr and Ralph L. Stephenson, a paper presented at the University of Kansas Sanitary Engineering Conference, 1964.

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15. "Effect of Lagoon Effluent on a Receiving Stream", by Darrell L. King, Allen J. Tolmsoff, and Michael J. Atherton, a paper given at the Second International Symposium on Waste Treatment Lagoons, Kansas City, Mo., June, 1970.

16. "Algae and Their Effects on D.O. and BOD", by T. F. Wisniewski, in Water and Sewage Works", p. 235, June, 1958.

17. "Algae and Their Effects on D.O. and BOD", by A.F. Bartsch, Water and Sewage Works, p. 339, Aug., 1958.

18. "Algae as a Source of Oxygen in Waste Treatment", by A. F. Bartsch, JWPCF 33:3, p. 239, March, 1961.

19. "Algal Respiration in a Eutrophic Environment", by A. J. McDonnell and R. P. Kountz, JWPCF 38:5, p. 841, May, 1966.

20. "Retention Pond Improves Activated Sludge Effluent Quality", by E. B. Fall, Jr., JWPCF 37:9, p. 1194-1202, Sept., 1965.

21. "Redesigning Existing Facilities to Increase Hydraulic and Organic Loading", by E.B. Fall, Jr. JWPCF 43:8, p. 1695-1701 (Aug.;1971).

22. Private Communication with Mr. Ken Mutousec, Industrial Chemist, Greater Peoria Sanitary District, November 23, 1976.

APPENDIX

ATTACHMENT A - NPDES PERMIT IN 0032191

EFFLUENT LIMITATION AND COMPLIANCE SCHEDULE FOR AWT AND AMMONIA REMOVAL

IMPLEMENTATION STEPS AND COMPLIANCE SCHEDULE

ATTACHMENT A

5. Effluent Limitations and Compliance Schedule for AWT and Ammonia Removal

A. The average daily quantity of effluent discharged from the wastewater treatment facility during a calendar month shall not exceed 60 million gallons per day (mgd) unless the pollutant loadings to the stream (pounds or kilograms per day) of biochemical oxygen demand and suspended solids, shown in Table 1, are not exceeded.

B. During the period beginning on January 1, 1979 and lasting until the expiration date, the quality of effluent shall be limited at all times as follows:

The alternative effluent concentration limitations, shown in Table 1, have been determined to meet the Water Quality Criteria Standards in the Maumee River by the Indiana Stream Pollution Control Board. The various alternatives of effluent Dissolved Oxygen, 5-day biochemical oxygen demand and ammonia nitrogen concentration are approved for discharge dependent upon an acceptable cost effective analysis by the permittee.

(1) BOD

The arithmetic mean of the five-day Biochemical Oxygen Demand samples collected in a calendar month shall not exceed the concentration in milligrams per liter of the alternative selected from Table 1, or a total quantity (kilograms or pounds per day) calculated from the design flow and the effluent concentration limitation of the selected alternative. The arithmetic mean of these values for effluent samples collected in a calendar week within the calendar month shall not exceed a concentration of 150 percent of the monthly limitation.

(2) SS

The arithmetic mean of the suspended solids values for effluent samples collected in a calendar month shall not exceed the concentration in milligrams per liter of the five-day biochemical oxygen demand concentration limitation shown in Table 1 for the alternative selected or a total quantity (kilograms or pounds per day) calculated from the design flow and the effluent concentration limitation of the selected alternative. The arithmetic mean of these values for effluent samples collected in a calendar week within the calendar month shall not exceed a concentration of 150 percent of the monthly limitation.

(3) pH

The effluent values for pH shall remain within the limits of 6.0 to 9.0.

(4) Fecal Coli

The geometric mean of the fecal coliform bacteria values for effluent samples collected in a calendar month shall not exceed 200 per 100 milliliters. The geometric mean of these values for effluent samples collected in a calendar week within the calendar month shall not exceed 400 per 100 milliliters.

(5) Residual Chlorine

The effluent shall be disinfected on a continuous basis with a chlorine residual maintained at a concentration not to exceed a maximum of 1.0 milligram per liter at the point of discharge.

(6) Dissolved Oxygen

The average daily concentration of dissolved oxygen in the effluent shall not be less than the alternative effluent concentration limitation shown in Table 1 for the alternative selected.

(7) Ammonia Nitrogen

The maximum daily concentration of ammonia nitrogen in the effluent shall not exceed the alternative effluent concentration limitation shown in Table 1 for the alternative selected.

ATTACHMENT A

TABLE 1

ALTERNATIVE EFFLUENT CONCENTRATION LIMITATIONS

FOR THE PERIOD JUNE 1 THROUGH AUGUST 31

Alternative	DO-mg/l	BOD_5-mg/l	NH_3-N-mg/l	In Stream NH_3-N-mg/l	In Stream DO-mg/l
1	6.0	10.0	1.1	0.89	5.02
2	6.0	6.7	1.4	1.09	5.05
3	7.0	10.0	1.3	1.04	5.03
4	7.0	6.7	1.7	1.32	4.99
5	8.0	10.0	1.5	1.18	5.03
6	8.0	6.7	1.9	1.46	5.02

FOR THE PERIOD SEPTEMBER 1 THROUGH MAY 31

Alternative	DO-mg/l	BOD_5-mg/l	NH_3-N-mg/l	In Stream NH_3-N-mg/l	In Stream DO-mg/l
1	6.0	10.0	2.1	2.0	4.99
2	6.0	6.7	2.5	2.36	4.99
3	7.0	10.0	2.5	2.30	5.01
4	7.0	6.7	2.6	2.68	5.01
5	8.0	10.0	2.7	2.57	4.99
6	8.0	6.7	3.1	2.94	5.01

DO = Dissolved oxygen
BOD = 5-day biochemical oxygen demand
NH_3 - N = Ammonia Nitrogen

ATTACHMENT A

6. Implementation Steps and Compliance Schedule for AWT & NH_3-N Removal

The permittee shall achieve compliance with the effluent limitations specified in this attachment for advanced waste treatment and ammonia removal in accordance with the following schedule.

IMPLEMENTATION STEPS	COMPLIANCE SCHEDULE		
	Yr.	Mo.	Day
Completion of Preliminary Plans	75	07	01
Completion of Final Plans	76	04	01
Begin Construction	77	01	01
Progress Reports	77	09	01
	78	05	01
End Construction	79	01	01

Not later than 14 days following each interim date and the final date of compliance, the permittee shall provide the Regional Administrator and the Indiana Stream Pollution Control Board with written notice of the permittee's compliance or noncompliance with the interim or final requirements.

APPENDIX D

PUBLIC PARTICIPATION

EXHIBITS

PUBLIC PARTICIPATION

LIST OF EXHIBITS

A-1	Public Notice for Public Hearing - News Sentinel
A-2	Public Notice for Public Hearing - Journal-Gazette
B-1,2	List of Fort Wayne Organizations Receiving Special Invitation to Comment at Public Hearing
C	Registration List for Public Hearing
D	Agenda and Fact Sheet
E	Letter from C. James Owen, Direction Community Development
F	Letter from Mr. Jerry E. Dehner, V. Pres., John Dehner, Inc.
G	Letter from Dr. Jane M. Irmscher, M.D., Allen Co. Health Commission
H	Letter from Robert C. Arnold, Supt. Parks & Recreation
I	Letter from Jack G. Suter, Exec. Director, Allen Co. Plan Commission
J-1	Letter from James Bredin, Assoc. Planner, NIRCC
J-2	Letter from Elias G. Samaan, Exec. Director, NIRCC
K	Letter from Board of Commissioners, Vance Amstate and Jack Dunifon
L	Position Statement - State Agency
M	Mr. Philip Schnelker - Letters
N	Mr. Bernard T. Perry - CPA - Letter
O	Mrs. Ethyle Bloch and Mrs. Jane Dustin - Fort Wayne IWLA - Letter
P	R. E. Macy, Tokheim Corp. - Letter
Q	Earl Thompson, Falstaff Brewing Corp. - Letter
R	Stephen D. Long - City Attorney - Letter
S	Robert S. Olsen, Resident - Letter
T	Statement on Historical/Archeological Review

Form Prescribed by State Board of Accounts

Fort Wayne Board of Public Works
(Governmental Unit)

Allen County, Ind.

To THE NEWS-SENTINEL Dr.

FORT WAYNE, INDIANA

PUBLISHER'S CLAIM

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Display	Matter (Must not exceed two actual lines, neither of which shall total more than four solid lines of the type in which the body of the advertisement is set) — number of equivalent lines	
Head	number of lines	4
Body	number of lines	35
Tail	number of lines	5
	Total number of lines in notice	44

COMPUTATION OF CHARGES

44 lines, 1 columns wide equals 44 equivalent lines at .259¢ cents per line	$ 11.40
Additional charge for notices containing rule or tabular work (50 per cent of above amount)	
Charge for extra proofs of publication (50 cents for each proof in excess of two)	
TOTAL AMOUNT OF CLAIM	$ 11.40

DATA FOR COMPUTING COST

Width of single column ~~11~~ 9.9 ems

Size of type 5½ point

Number of insertions 2

Size of quad upon which type is cast 5½

Pursuant to the provision and penalties of Ch. 89, Acts 1967,

I hereby certify that the foregoing account is just and correct, that the amount claimed is legally due, after allowing all just credits, and that no part of the same has been paid.

V. E. Gerken

Date December 28, 19 76

Title CLERK

NOTICE OF PUBLIC HEARING ON ADVANCED WASTEWATER TREATMENT PROJECT FORT WAYNE, INDIANA

The Fort Wayne Board of Public Works hereby gives notice to all citizens of Allen County of a Public Meeting to discuss documentation relative to a Fort Wayne Water Pollution Control Plant Expansion Project. *More specifically*, the meeting will deal with the Advanced Wastewater Treatment Project, which will provide service for Fort Wayne and its environs. This project will contribute to satisfying the water quality requirements established by the Indiana Stream Pollution Control Board for the Maumee River.

Facilities Plan documents and project plans and specifications are available for public inspection during normal working hours at the following location:

The City of Fort Wayne
Board of Public Works
City-County Bldg.
One Main Street
Ft. Wayne, Indiana

Public comments will be received on Thursday, the 20th day of January, 1977 at 7:00 P.M. in the conference room of the Board of Public Works located on the 9th floor of the City-County Building, Fort Wayne, Indiana. Written comments addressed to the Fort Wayne Board of Public Works will be accepted and considered until January 14, 1977.

Henry P. Wehrenberg
Ethel H. LaMar
Max G. Scott
Board of Public Works
ATTEST: Ursula Miller
12—21-28

COPY OF
MENT HERE

PUBLISHER'S AFFIDAVIT

~~State of~~ Indiana
ALLEN County } ss:

Personally appeared before me, a notary public in and for said county and state, the undersigned V.E. GERKEN who, being duly sworn, says that she is CLERK of the NEWS-SENTINEL a DAILY newspaper of general circulation printed and published in the English language in the city ~~town~~ of FORT WAYNE, INDIANA in state and county aforesaid, and that the printed matter attached hereto is a true copy, which was duly published in said paper for 2 time s, the dates of publication being as follows:

12/21-28/76

V. E. Gerken

Subscribed and sworn to before me this 28th day of December 19 76

Notary Public

My commission expires September 28, 1979

Form 903
Revised 1973

Form Prescribed by State Board of Accounts | General Form No. 99 P (Rev. 1967) | EXHIBIT A-2

Fort Wayne Board of Public Works
(Governmental Unit)

Allen County, Ind.

To JOURNAL-GAZETTE Dr.

FORT WAYNE, INDIANA

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Head	number of lines	6
Body	number of lines	35
Tail	number of lines	5
	Total number of lines in notice	46

COMPUTION OF CHARGES

44 lines, 1 columns wide equals 44 equivalent lines at .259¢ cents per line	$ 11.40
Additional charge for notices containing rule or tabular work (50 per cent of above amount)	
Charge for extra proofs of publication (50 cents for each proof in excess of two)	
TOTAL AMOUNT OF CLAIM	$ 11.40

DATA FOR COMPUTING COST

Width of single column ~~11~~ 9.9 ems | Size of type 5½ point

Number of insertions 2 | Size of quad upon which type is cast 5½

Pursuant to the provision and penalties of Ch. 89, Acts 1967,

I hereby certify that the foregoing account is just and correct, that the amount claimed is legally due, after allowing all just credits, and that no part of the same has been paid.

Arvilla DeWald

Date December 28, 1976 | Title CLERK

NOTICE OF PUBLIC HEARING
ON ADVANCED WASTEWATER
TREATMENT PROJECT
FORT WAYNE, INDIANA

The Fort Wayne Board of Public Works hereby gives notice to all citizens of Allen County of a Public Meeting to discuss documentation relative to a Fort Wayne Water Pollution Control Plant Expansion Project. More specifically, the meeting will deal with the Advanced Wastewater Treatment Project, which will provide service for Fort Wayne and its environs. This project will contribute to satisfying the water quality requirements established by the Indiana Stream Pollution Control Board for the Maumee River.

Facilities Plan documents and project plans and specifications are available for public inspection during normal working hours at the following location:

The City of Fort Wayne
Board of Public Works
City-County Bldg.
One Main Street
Ft. Wayne, Indiana

Public comments will be received on Thursday, the 20th day of January, 1977 at 7:00 P.M. in the conference room of the Board of Public Works located on the 9th floor of the City County Building, Fort Wayne, Indiana. Written comments addressed to the Fort Wayne Board of Public Works will be accepted and considered until January 14, 1977.

Henry P. Wehrenberg
Elmer H. Lauer
Max G. Scott
Board of Public Works
ATTEST: Ursula Miller
12-21 28

COPY OF
ENT HERE

PUBLISHER'S AFFIDAVIT

State of Indiana
ALLEN County } ss:

Personally appeared before me, a notary public in and for said county and state, the undersigned ARVILLA DEWALD who, being duly sworn, says that she is CLERK of the JOURNAL-GAZETTE a DAILY newspaper of general circulation printed and published in the English language in the city ~~town~~ } of FORT WAYNE, INDIANA in state and county aforesaid, and that the printed matter attached hereto is a true copy, which was duly published in said paper for 2 time s, the dates of publication being as follows:

12/21-28/76

Arvilla DeWald

Subscribed and sworn to before me this 28th day of December 1976

Notary Public

My commission expires September 28, 1979

Form #904

EXHIBIT B-1

LIST OF FORT WAYNE ORGANIZATIONS RECEIVING SPECIAL INVITATIONS TO COMMENT AT PUBLIC HEARING

NAME AND AFFILIATION	ADDRESS	TELEPHONE
CITY OF FORT WAYNE DEPARTMENTS AND AGENCIES		
City-County Building Dept. Troy Yeoman	308 E. Berry Ft. Wayne, IN 46802	423-7131
Economic Development Commission Wayne Simerman	501 Wolf Drive Ft. Wayne, IN 46825	484-2679
Community Development & Planning Dr. James Owen	Room 950, City-County Bldg. Ft. Wayne, IN 46802	423-7708
City Park Department Robert Arnold	Room 840, City-County Bldg. Ft. Wayne, IN 46802	745-4503
Redevelopment Commission Robert P. Turk, Exec. Director	Room 830, City-County Bldg.	423-7564
Leonard Weinraub, Pres. of Commissioners	205 W. Wallace Ft. Wayne, IN 46804	
County Council Christa Hockensmith	Room 102, City-County Bldg. Ft. Wayne, IN 46802	423-7241
City Councilman James Stier	3404 Congress Ft. Wayne, IN 46806	447-4491
ALLEN COUNTY AND REGIONAL AGENCIES		
Northeast Indiana Regional Coordinating Council Elias Samaan	Room 640, City-County Bldg. Ft. Wayne, IN 46802	423-7309
Allen County Soil & Water Conservation Ellis McFadden	17414 Comer Road Ft. Wayne, IN 46819	639-6147
Allen County Plan Commission Jack Suter	Room 630, City-County Bldg. Ft. Wayne, IN 46802	423-7096

EXHIBIT B-1

LIST OF FORT WAYNE ORGANIZATIONS RECEIVING SPECIAL INVITATIONS TO COMMENT AT PUBLIC HEARING (Cont'd)

NAME AND AFFILIATION	ADDRESS	TELEPHONE
County Commissioners		
Vance Amstutz	Room 200, City-County Bldg.	423-7007
Jack Dunifon	Room 200, City-County Bldg.	423-7007
Richard Ellenwood	Room 200, City-County Bldg. Ft. Wayne, IN 46802	423-7007
City-County Board of Health		
Dr. Kaiser	Room 550, City-County Bldg. Ft. Wayne, IN 46802	423-7395

EXHIBIT B-2

LIST OF ORGANIZATIONS RECEIVING SPECIAL INVITATIONS TO COMMENT AT PUBLIC HEARING

CIVIC AND COMMUNITY ORGANIZATIONS

NAME AND AFFILIATION	ADDRESS	TELEPHONE
Izaak Walton League Thomas Dustin	1802 Chapman Road Huntertown, IN 46748	(219) 736-6264
Coalition for the Environment Joe Taylor	342 W. Branning Avenue Ft. Wayne, IN 46807	745-7710
Voluntary Participation Committee Pat Wuellner	4225 Tacoma Avenue Ft. Wayne, IN 46807	744-2946
Chamber of Commerce D. J. Petruccelli	826 E. Ewing Ft. Wayne, IN 46802	424-1435
League of Women Voters Karen Duemling	2317 Hiawatha Blvd. Ft. Wayne, IN 46809	747-6916
Ft. Wayne Home Builders Association	2820 Trent Drive Ft. Wayne, IN 46805	483-891;
Ft. Wayne Futures Andy Williams	5622 Smith Street Ft. Wayne, IN 46802	745-4503
Stockbridge Audubon Society Edward Musser	2415 Fox Avenue Ft. Wayne, IN 46807	456-8060
Indiana Conservation Council Phil Alexander	15831 Canyon Glen Parkway Ft. Wayne, IN 46808	637-5166

STATE AGENCIES

NAME AND AFFILIATION	ADDRESS	TELEPHONE
Indiana State Board of Health	1330 W. Michigan Street Indianapolis, Indiana	

EXHIBIT B-2

LIST OF ORGANIZATIONS RECEIVING SPECIAL INVITATIONS TO COMMENT AT PUBLIC HEARING

NAME AND AFFILIATION	ADDRESS	TELEPHONE
Indiana Stream Pollution Control Board		
Mr. Oral Hert, Technical Secretary	1330 West Michigan Street Indianapolis, IN 46206	(317) 633-4941
Mr. Jerry Dickerson, Grants Coordinator	1330 West Michigan Street Indianapolis, IN 46206	(317) 633-5249
NEWS MEDIA		
WANE - TV	2915 W. State Blvd. Ft. Waune, IN 46805	
WKJG - TV	2633 W. State Blvd. Ft. Wayne, IN 46805	
WPTA - Tv	3401 Butler Road Ft. Wayne, IN 46808	
News Sentinel	600 West Main Street Ft. Wayne, IN	
Journal-Gazette	600 West Main Street Ft. Wayne, IN	

EXHIBIT C

REGISTRATION LIST
FOR THE
PUBLIC HEARING ON THE
FACILITIES PLAN FOR WASTEWATER TREATMENT - SECOND AMENDMENT

January 20, 1977

7:00 P.M.

BOARD OF PUBLIC WORKS
CITY-COUNTY BUILDING
FORT WAYNE, INDIANA

NAME	COMPANY OR ORGANIZATION
Jerry Graff	News-Sentinel
Don Ort	HNTB Indianapolis
Ray Kocher	HNTB-Indianapolis
Ron Wukasch	Purdue University
Virginia Bensheimer	Journal-Gazette
Jane Dustin	Ft. Wayne Chapter Izaak Walton Lg.
Ethyle Bloch	Ft. Wayne Chapter Izaak Walton Lg.
D. Thomas Carlton	Magnavox Company
Philip W. Wittmer	Magnavox G.& I.
Richard J. Rajchel	Magnavox Company
Fred Feustel	
Terry King	International Harvester
I. Baker	International Harvester
Jim Lauer	Philip L. Schnelker, Inc.
Phil Schnelker	Philip L. Schnelker, Inc.
Sabah Saud	W.P.C. Engineering
Bernard T. Perry	CPA
Albert N. Hepler	City Utilities
Richard Walker	City Utilities
Neil Wisler	W.P.C. Plant
Paul Brunner	W.P.C. Plant
Stu Becker	W.P.C. Plant
Paul Rajchel	
Donald Mohrman	General Electric
Robert S. Olsen	General Electric
Edward Krall	American Hoist
Sharon Krall	
Robert E. Macy	Tokheim Corporation
Richard D. Le Blanc	Joslyn Steel
Eric Burkhardt	WGL Radio
Andy Dodzik	Ronald L. Bonar & Assoc. Inc.
Jim Russell	HNTB
Del Prah	HNTB

CITY STAFF:

Henry Wehrenberg,	Board of Public Works, Chairman
Ethel LaMar	Board of Public Works, Member
Max Scott	Board of Public Works, Member
Joe Morreale	City Utilities, Superintendent
Howard Biggs	City Engineer
Phil Boller	W.P.C. Chief Engineer
Ron Pitzer	W.P.C. Engineering

EXHIBIT D-1

AGENDA

for the

PUBLIC HEARING

on the

FACILITIES PLAN FOR WASTEWATER TREATMENT

SECOND AMENDMENT

7:00 P.M.
January 20, 1977
Board of Public Works Conference Room
9th Floor, City-County Building
Fort Wayne, Indiana

I. Opening Statements

Mr. Henry P. Wehrenberg
Chairman, Board of Public Works
Fort Wayne, Indiana

II. Project Description

A. Public Participation in the Facilities Planning Process
B. History of the Wastewater Treatment Project
C. Facilities Plan for Ammonia-Nitrogen Removal and Effluent Polishing

III. Comments

A. Bernard Perry, C.P.A.
B. Indiana Stream Pollution Control Board
C. Environmental Protection Agency
D. Fort Wayne Board of Public Works
E. Northeastern Indiana Regional Coordinating Council
F. Community Development and Planning
G. County Plan Commission
H. Chamber of Commerce
I. Civic Organizations
J. Citizens

Participants should state their name and, when applicable, the name of the organization they represent.

EXHIBIT D-2

FACT SHEET

Public Hearing for the Facilities Plan for Wastewater Treatment - Second Amendment

January 20, 1977
Board of Public Works Conference Room
Fort Wayne, Indiana

Introduction

The Fort Wayne Water Pollution Control Wastewater Treatment Plant is located on the Maumee River approximately one mile west of the U. S. 30 Bridge. The plant provides primary and secondary treatment, chlorination, and ponding of the wastewater before discharge to the river. The primary and secondary treatment facilities are located on the south side of the river with the chlorine contact tank and ponds located on the north side of the river.

The City is presently engaged in an expansion project at the treatment plant. At the conclusion of this program, the plant will have primary treatment, secondary treatment, and chlorination design capacities of 60 million gallons per day (MGD).

In accordance with the present NPDES Permit, the City filed for and received a Step I grant for the preparation of a Facilities Plan for Advanced Wastewater Treatment. The major elements of Advanced Wastewater Treatment are ammonia-nitrogen removal and effluent polishing. This plan services the same area as delineated by the Facilities Plan for Wastewater Treatment, Amended April, 1974. Therefore, the Advanced Wastewater Treatment facilities will have a design capacity of 60 MGD.

Estimated Construction Costs of the Selected Alternative

The treatment process selected to meet the effluent limitations established by the Indiana Stream Pollution Control Board is single-stage nitrification for ammonia-nitrogen removal followed by dual-media gravity filtration for effluent polishing. It is proposed that the construction of these facilities will be completed in three phases. The estimated construction costs for each phase are presented below.

EXHIBIT D-3

CONSTRUCTION COST ESTIMATE FOR AERATION PROCESS EFFICIENCY UPGRADING

PHASE A - AERATION PROCESS EFFICIENCY UPGRADING	Estimated Construction Cost
Blower No. 5 Installation	
Modifications to Blower Building	$ 112,000
Equipment & Materials	373,000
Installation & Testing	122,500
Electrical	102,500
Aeration Diffusers Efficiency Improvements	
Equipment & Materials	154,000
Installation	96,000
Return Sludge Pumping Efficiency Improvements	
Increase Capacity on Tanks 1, 2, 3, 4, 5	100,000
Terminal Pond Effluent Reaeration	
Effluent Reaeration System	80,000
Pond Dredging Pumping System	
Dredgings Pumping Station	150,000
Dredgings Pumping Pipeline	250,000
Electrical & Controls	10,000
Process Control System	
Equipment & Instrumentation	80,000
Process Control System Changes	41,000
TOTAL PHASE A IMPROVEMENTS:	$1,671,000

EXHIBIT D-4

CONSTRUCTION COST ESTIMATE FOR NITRIFICATION AND EFFLUENT POLISHING TO 98% REMOVAL

PHASE B - FULL SCALE NITRIFICATION TO 60 MGD	Estimated Construction Cost
Blower No. 6 Installation	
Modifications to Control Building	$ 295,000
Equipment & Materials	412,000
Electrical	121,500
Chlorination System	
Upgrade 3 Existing Units	25,000
Two New Chlorinators	50,000
Return Sludge Pumping Changes	
Increase Capacity on Tanks 6, 7, 8, 9	120,000
PHASE C - EFFLUENT POLISHING TO 60 MGD	
Secondary Effluent Pumping Station	
Structure	601,000
Pumps & Equipment	192,000
Piping & Valves	120,000
Pump Controls & Electrical	261,000
Dual-Media Gravity Filters	
Structure	2,850,000
Filter Equipment & Controls	3,900,000
Piping & Valves	880,000
Backwash Dirty Water Tank	
Structure	250,000
Equipment & Controls	50,000
Effluent Reaeration and Outfall	
Structures	100,000
Piping & Flow Diversion Gates	40,000

EXHIBIT D-5

CONSTRUCTION COST ESTIMATE FOR NITRIFICATION AND EFFLUENT POLISHING TO 98% REMOVAL (Cont'd)

PHASE C - EFFLUENT POLISHING TO 60 MGD (Cont'd)	Estimated Construction Cost
Flood Protection Levee & Site Work	
Earthwork	$ 580,000
Gravel Roadway	20,000
Fencing	40,000
Process Control System	
Equipment & Instrumentation	500,000
Interconnection with Existing Process Control System	250,000
Graphic Panel Additions	150,000
Electrical Work	
Standby Power Generator & Switchgear	300,000
Main Service & Switchgear	250,000
Motor Control Centers	475,000
Process Equipment Instrumentation for Electrical	450,000
Buildings	40,000
Area Lighting	60,000
Operations During Start-Up	150,000
TOTAL ESTIMATED PHASE B & PHASE C CONSTRUCTION COST @ 1980	$13,532,500

ESTIMATED ANNUAL OPERATION AND MAINTENANCE COSTS

Present	$ 873,000
Completion of Plant Expansion Project - 1977	1,562,000
Completion of Phase A - 1978	2,292,000
Completion of Phases B and C - 1983	4,467,000

EXHIBIT D-6

Implementation Schedule

The City proposes to implement Advanced Wastewater Treatment in three phases. The first stage, Phase A, will upgrade the aeration efficiency to permit single-stage nitrification to 42 MGD. The construction work for this phase will be completed in 1978. Phase B will increase the nitrification capabilities to 60 MGD. Phase C will provide for effluent polishing to a 98% removal efficiency. Phase B and Phase C are intended to be implemented simultaneously.

IMPLEMENTATION SCHEDULE

Item	Anticipated Needs	Date Completed
A. Aeration Process Efficiency Upgrading	1) Install high-efficiency aeration headers in Tanks 4 and 5.	June, 1978
	2) Install Blower No. 5 to increase aeration capacity to 125,000 SCFM.	June, 1978
	3) Install new return sludge high recycle rate pumps on Tanks 1,2,3,4 and 5 and modify existing secondary sludge collector mechanisms.	June, 1978
	4) Pond dredging pumping system relocation to sludge lagoons.	June, 1978
B. Facility Plan for Full Scale Nitrification	1) Install future Blower No. 6 to increase aeration capacity to 147,000 SCFM.	July, 1982
	2) Install new return sludge pumps for Aeration Tanks 6, 7, 8 and 9.	July, 1982
	3) Increase total chlorination capacity to 56,000 lbs./day.	July, 1982
C. Upgrading Effluent Polishing to 98%	1) Construct 4 new secondary Effluent Pumps @ 24 MGD each.	January, 1983
	2) Construct new Dual-Media Gravity Filters at 14,000 ft.^{2} 3.0 GPM/ft.^{2} at 60 MGD.	January, 1983
	3) Construct 2 each new 23,000 GPM Backwash Pumps.	January, 1983
	4) Construct new Backwash Surge Tank 1.0 MG.	January, 1983

EXHIBIT D-7

Effects on the User Charge and the Industrial Cost Recovery System

The City has submitted a report on the User Charge and Industrial Cost Recovery System to the EPA for approval as part of the present WPC Plant Expansion Project. The estimated effects on Phase A (completion in 1978) and Phases B and C (completion in 1983) on these charges are presented below.

User Charge

Residential monthly charge based on 1500 cubic feet of sewage:

Present Proposed User Charge	$ 4.80/mo.
Completion of Plant Expansion Project - 1977	6.89/mo.
Completion of Phase A - 1978	7.52/mo.
Completion of Phase B and Phase C - 1983	11.87/mo.

Increase for Industrial Class over present proposed User Charge. (Present porposed User Charge is 100%)

Completion of Plant Expansion Project - 1977	158.6%
Completion of Phase A - 1978	176.6%
Completion of Phase B and Phase C - 1983	301.1%

Industrial Cost Recovery System

The following costs are the estimated Industrial Cost Recovery charges per unit of flow capacity expressed in cents per 100 cubic feet based on 60 million gallons per day.

Completion of Plant Expansion Project - 1977	2.86¢/100 cu.ft.
Completion of Phase A - 1978	3.00¢/100 cu.ft.
Completion of Phase A and Phase C - 1983	4.16¢/100 cu.ft.

Local Share of Capital Costs - Annual Debt Service

Present Share	$ 489,000
Completion of Plant Expansion Project - 1977	1,101,000
Completion of Phase A - 1978	1,122,000
Completion of Phase B and Phase C - 1983	1,289,000

EXHIBIT D-8

Additional Information

Additional information concerning the project may be obtained from the following:

The City of Fort Wayne
Board of Public Works
920 City-County Building
One Main Street
Fort Wayne, Indiana 46802

Henry B. Steeg & Associates, A Division
of Howard Needles Tammen & Bergendoff
3333 Founders Lane
Indianapolis, Indiana 46268

Indiana Stream Pollution Control Board
1330 West Michigan Street
Indianapolis, Indiana 46205

EXHIBIT E

THE CITY OF FORT WAYNE
COMMUNITY DEVELOPMENT & PLANNING

January 17, 1977

Board of Public Works
City of Fort Wayne
920 City-County Building
Fort Wayne, Indiana 46802

Subject: Public Hearing on the Facilities Plan for Wastewater Treatment - Second Amendment; Advanced Waste Treatment

Gentlemen and Mrs. LaMar:

We have reviewed the City's plans to increase the efficiency of the Water Pollution Control Wastewater Treatment Plant and to provide Advanced Wastewater Treatment in the continuing effort to abate pollution to the Maumee River. This department fully supports this Facilities Plan which will serve to attain the City's water quality goals.

We are hopeful that the Fort Wayne Board of Public Works will continue planning for the protection of the streams and rivers of this community.

Sincerely,

C. James Owen
Director, Community Development
and Planning

CJO:cc

BOARD OF PUBLIC WORKS

JAN 18 1977

AN EQUAL OPPORTUNITY EMPLOYER

Kon

EXHIBIT F

JOHN DEHNER, Inc. • *Contractors*

OFFICE: 1208 CLARK ST.
P.O BOX 1346
PHONE: (219) 422-7677

BUILDERS OF
SEWERS, WATERWORKS, ROADS
DRAINAGE, EXCAVATING & GRADING

YARD: 5406 WINCHESTER ROAD
PHONE: 747-4866
AREA CODE 219

FORT WAYNE, INDIANA 46801

RECEIVED
JAN 19 1977
Water Pollution Control Engr. Dept.
City-County Building, One Main St.
Ft. Wayne, Indiana 46802

January 19, 1977

Mr. Henry Wehrenberg
Chairman
Board of Public Works
920 City County Building
Fort Wayne, Indiana 46802

SUBJECT: Advanced Wastewater Treatment Project

Dear Henry:

I personally want to thank you for allowing me the opportunity to meet with Philip Boller, your Water Pollution Control Chief, to review the City's plans to provide advanced wastewater treatment and update and increase the wastewater treatment plant; thereby abating pollution to the Maumee River. I feel that your plan for an additional blower in the Blower Building would be sufficient and cheaper than the installation of a large number of filters. Being Contractors, we are also taxpayers and wish to express are appreciation for your efforts in cleaning up our rivers and streams. If we can be of any service to you now or in the future, we are at your idsposal. I again wish to express my thanks.

Sincerely,
JOHN DEHNER, INC.

Jerry

Gerald Dehner
Vice-President

GD:rc

EXHIBIT G

FORT WAYNE-ALLEN COUNTY BOARD of PUBLIC HEALTH

5th Floor, City-County Building, One Main Street
Fort Wayne, Indiana 46802

NOTED
☐ H.P.W.
☐ E.H.L.
☐ M.GS.
Date________

January 18, 1977

BOARD OF PUBLIC WORKS
RECEIVED
JAN 19 1977

Board of Public Works
City of Fort Wayne
920 City-County Building
Fort Wayne, Indiana 46802

Gentlemen and Mrs. LaMar:

The Fort Wayne-Allen County Department of Public Health has reviewed the City's plans to increase the efficiency of the Water Pollution Control Wastewater Treatment Plant and to provide Advanced Wastewater Treatment in the continuing effort to abate pollution to the Maumee River. We fully support this Facilities Plan which will serve to attain the City's water quality goals.

We are hopeful that the Fort Wayne Board of Public Works will continue planning for the protection of the streams and rivers of this community.

Sincerely,

Jane M. Irmscher

Jane M. Irmscher, M.D.
Health Commissioner

JMI:wr

EXHIBIT H

THE CITY OF FORT WAYNE
department of public parks

BOARD OF PUBLIC WORKS
RECEIVED
JAN 18 1977

January 18, 1977

NOTED
☐ H.P.W.
☐ E.H.L.
☐ M.E.S. –

Board of Public Works
City of Fort Wayne
920 City-County Building
Fort Wayne, Indiana 46802

Subject: Public Hearing on the Facilities Plan for Wastewater Treatment - Second Amendment; Advanced Waste Treatment

Gentlemen and Mrs. LaMar:

One of the primary goals of the Fort Wayne Park Board is "To save and preserve our major natural land and water resources including the rivers, riverbanks, drainage patterns, and open spaces." We urge the Board of Public Works to implement plans to increase the effeciency of the Wastewater Treatment Plant and provide Advanced Wastewater Treatment in the continuing effort to reach the goal of 100% pollution abatement to the Maumee River.

Our city is blessed with a major natural resource, we are hopeful that planning for the protection and preservation of the streams and rivers of this community will continue.

Sincerely,

Robert C. Arnold

Robert C. Arnold
Superintendent of Parks
and Recreation

RCA/djr

EXHIBIT I

acpc

Jack G Suter • executive director • 219-423-7096

allen county plan commission • 630 city-county building • one main street • fort wayne, indiana • 46802

January 18, 1977

Board of Public Works
City of Fort Wayne
920 City-County Building
Fort Wayne, Indiana 46802

Subject: Public Hearing on the Facilities Plan for Wastewater Treatment - Second Amendment; Advanced Waste Treatment

Gentlemen and Mrs. LaMar:

The Allen County Plan Commission has reviewed the City of Fort Wayne's plans to increase the efficiency of the Water Pollution Control Wastewater Treatment Plant and to provide Advanced Wastewater Treatment by adding facilities to remove ammonia at the site of the terminal lagoons. We understand that the facility is the most effective method proposed by the consultant and we support any efforts which would better achieve optimum water quality.

Cordially,

Jack G. Suter

JGS/ss

RECEIVED

JAN 18 1977

Water Pollution Control Engr. Dept.
City-County Building, One Main St.
Ft. Wayne, Indiana 46802

EXHIBIT J-1

northeastern indiana regional coordinating council
640 city-county bldg. · one main st. · ft. wayne, in. 46802
Elias G. Samaan, executive director 219-423-7309

January 19, 1977

Board of Public Works
City of Fort Wayne
920 City-County Bldg.
Fort Wayne, IN 46802

Gentlemen and Mrs. LaMar:

SUBJECT: Public Hearing on the Facilities Plan for Wastewater Treatment - Second Amendment: Advanced Wastewater Treatment

The N.I.R.C.C. cannot make an official statement until the Council has had the opportunity to review the Facilities Plan in question. An A-95 Review of the project will take place at the February 13, 1977 Council meeting and at that time the Council will review and comment on the technical aspects of the Facilities Plan. However, the Council does support the nature of the project in as much as the plan does serve to protect the streams and rivers of the community through the continuing effort of pollution abatement to the Maumee River.

Sincerely,

James Bredin

James Bredin
Associate Planner

EXHIBIT J-2

northeastern indiana regional coordinating council

640 city-county bldg. · one main st. · ft. wayne, in. 46802

Elias G. Samaan, executive director 219-423-7309

February 23, 1977

Mr. Delmar H. Prah
Howard Needles Tammen & Bergendoff
Henry B. Steeg & Associates Division
3333 Founders Lane
Indianapolis, Indiana 46268

Dear Mr. Prah:

RE: FACILITIES PLAN FOR WASTEWATER TREATMENT SECOND AMENDMENT; ADVANCED WASTE TREATMENT, CITY OF FORT WAYNE, INDIANA

The above application was submitted to the Northeastern Indiana Regional Coordinating Council for review on February 14, 1977. The following staff comments were presented to the members:

The purpose of the Facilities Plan Amendment is to include in the waste treatment facilities now under construction, a system for advanced waste treatment. The current capabilities of the facilities are not sufficient for meeting the final effluent limitations established under the City's National Pollutant Discharge Elimination System (N.P.D.E.S.) Permit. The provisions for final advanced waste treatment facilities identified under the Amendment will provide for effluent quality that will conform with the standards set by the N.P.D.E.S. Permit.

The major features of the selected plan are the following: 1) Utilization of existing activated sludge process facilities. 2) Addition of a secondary effluent pumping station and dual media gravity filtration system. 3) Upgrading of the existing chlorination system. 4) Use of a filtered effluent wire and cascade structure. 5) Use of Pond No. 2 as a dual use facility (combined sewer overflow and chlorinated secondary effluent) and Pond No. 3 used for chlorinated secondary effluent. 6) Continued use of headworks, primary clarifers, anaerobic digesters, and other existing systems for their normal functions.

The estimated cost of is expected to be $15,203,500. An increase in annual operatin and maintenance cost is estimated at $1,234,000. Staff review of the Facilities Plan found no conflicts with present Council plans and therefore recommends approval

Following review and discussion, the members voted to approve the application as submitted.

Very truly yours,

Elias G. Samaan

Elias G. Samaan
Executive Director

EGS/dm
CC: Mr. Jerry Dickerson

EXHIBIT K

BOARD OF COMMISSIONERS OF THE COUNTY OF ALLEN
Room 200, City-County Building
Fort Wayne, Indiana 46802
Vance L. Amstutz, Jack K. Dunifon, Richard M. Ellenwood

January 18, 1977

Board of Public Works
City of Fort Wayne
920 City-County Building
Fort Wayne, Indiana

Subject: Public Hearing on the Facilities Plan for Wastewater Treatment - Second Amendment; Advanced Waste Treatment

Gentlemen and Mrs. LaMar:

We, the Board of Commissioners of the County of Allen, have reviewed the City's plans to increase the efficiency of the Water Pollution Control Wastewater Treatment Plant and to provide Advanced Wastewater Treatment in the continuing effort to abate pollution to the Maumee River. We fully support this Facilities Plan which will serve to attain the City's water quality goals.

We are hopeful that the Fort Wayne Board of Public Works will continue planning for the protection of the streams and rivers of this community.

Sincerely,

BOARD OF COMMISSIONERS OF THE COUNTY OF ALLEN

Jack K. Dunifon

Vance L. Amstutz

BD/of/COM:srg

BOARD OF PUBLIC WORKS
JAN 18 1977

EXHIBIT L

City of Fort Wayne

Position Statement
Pertaining to Fort Wayne Advanced Waste Treatment

1. The State proposes the City of Fort Wayne delete from the Advanced Waste Treatment Facility Plan dated January 4, 1977, the option for further testing for a cost-effective alternative.

2. We recommend the City of Fort Wayne file an application for a Step 2 grant funds and when these funds are available instruct the Engineering Firm of HNTB to proceed with the applicable plant design. Currently the Facilities Plan indicates that single-stage nitrification, backup-breakpoint chlorination, dual media filtration, and effluent re-aeration are the cost-effective alternatives.

3. The Permit Section will recommend to the Indiana Stream Pollution Control Board that the Board modify the current NPDES permit to reflect the revised final effluent limitations proposed by the options under the waste load model, and based on treatment capabilities will recommend the following limitations:

	NH_3-N			BOD_u			D.O.
	Daily	Weekly	Monthly	Daily	Weekly	Monthly	At All Time
June 1 - Sept. 30	2.3 mg/l	1.7 mg/l	1.1 mg/l	20 mg/l	15 mg/l	10 mg/l	7.0 mg/l
Oct. 1 - May 30	4.6 mg/l	3.4 mg/l	2.2 mg/l	20 mg/l	15 mg/l	10 mg/l	

The ratio of BOD_u/BOD_5 will be set at 2.05.

4. Water Pollution Control Act Amendments of 1972 will not allow the extension compliance schedule beyond the existing period contained in the permit.

5. Since it is apparent the City is in violation of compliance dates in the permit and that it is unlikely that it will be able to meet future compliance dates, the staff would recommend that the Indiana Stream Pollution Control Board appoint a hearing officer for an administrative hearing. In an effort to resolve this action, staff will remain willing to pursue negotiations with the City to reach agreement on a schedule for future action which will demonstrate a renewed commitment to the goals of the original compliance schedule, and that compliance with such schedule shall be taken into account in considering future actions.

EXHIBIT M-1

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Philip L. Schnelker, P.E., President
James L. Russell, P.E. & L.S., Secretary
James G. Lauer, P.E.

RECEIVED
JAN 18 1977
Water Pollution [illegible]
City County Building One Main St.
Ft. Wayne, Indiana 46802

January 17, 1977

Board of Public Works
One Main Street
Fort Wayne, Indiana

Attention: Mr. Henry Wehrenberg, Chairman

Re: Public Hearing on Facilities Plan
for Advanced Waste Treatment, et al.
January 20, 1977

Gentlemen:

In considering the referenced I am enclosing herewith a copy of two pages taken from the Engineering News Record Magazine of January 13, 1977, that in effect represents my basic opinion on the matter at hand. Further I wish to comment relative to the matter at hand and the general concept of "clean waters" as follows:

1. Much of what is being proposed by the regulatory agencies could result in "treatment for treatment's sake" only and may have no redeeming social or environmental value, and undoubtedly would have adverse economic effects on the users of the system.

2. It makes no sense at all to construct a super-sophisticated sewage treatment plant that more than likely would produce an effluent far cleaner than the stream (if it isn't that way already), only to have thousands of homes and business establishments without sewers (at very least the priorities are confused).

3. Quite frankly, it appears to me that Fort Wayne has gone to the limit already in providing sewage treatment facilities and interceptor sewer lines, much of which was done willingly only because of the concept of "free" Federal money.

4. Whatever one thinks of past actions in this regard makes no difference in reality, as this particular proposal may well secure the full 85% capital funding, only to leave behind an O & M cost of unbelievable proportions that would be perpetual.

   To put it another way the City might pay 15 cents of each dollar of capital costs to construct something it can ill afford to operate and maintain, or may well be outmoded in the near future as new technology or information becomes available.

In summary, lest anyone get the idea that I am trying to undercut the engineering firm that prepared this Facilities Plan, leave me assure them now

EXHIBIT M-2

that they are badly mistaken as our firm has previously advised two of our long standing municipal clients that are faced with similar regulatory agency requirements, that they might better become more prepared to fight rather than accede to all the demands imposed in the original NPDES permits.

Trusting this transmittal may be of some value, I remain,

Very truly yours,

Philip L. Schnelker, P.E.

PLS:jcp

Encl.

[illegible]

EXHIBIT M-3

Bird habitat fouls I-10 plans

Mississippi highway planners have yet to figure out how to build an interchange on a section of I-10 under construction between Pascagoula and Biloxi, since a decision by the U.S. Supreme Court late last year in effect banned constructing the ramps in a swampy area inhabited by 40 rare Mississippi sandhill cranes.

The high court refused to review a federal appeals court ruling that set aside a 100,000-acre area in southern Mississippi as a critical habitat for the birds, thus preventing the state highway administration from building the planned interchange.

The suit, brought by the National Wildlife Federation in June, 1975, is the first time that a case based on the 1973 endangered species law went all the way to the Supreme Court. The decision will probably encourage environmentalists to press other cases aimed at blocking construction of federal projects that threaten to harm or destroy rare animal and plant life.

In its suit, the wildlife group charged that construction of the highway interchange would attract commercial development to the only area the nonmigratory birds still inhabit. A U.S. district court had approved construction, but the appeals court overturned that decision, forbade building the interchange and told the highway planners to find a solution that would not endanger the cranes. And it ordered the state to get approval of its plan from the Interior and Transportation departments.

The ruling leaves the state with a dilemma because the entire area outside the 100,000-acre section is taken up by a river or residential and commercial development, says Mississippi's federal highway administrator E.L. Shaw. He says local planners and lawyers are currently grappling with the problem. Meanwhile, state congressman Trent Lott (R) has scheduled meetings with the Interior and Transportation secretaries.

Meanwhile, says Shaw, work continues on a 6-mile-long I-10 viaduct project that was not enjoined by the court. The contractor, L & A Contracting Co., Hattiesburg, Miss., had not begun work on the $140,000 interchange ramps that were specifically halted by court order.

One possible solution, says Shaw, would be for Interior to agree to reduce the size of the critical habitat area. Any new proposal, however, would have to go through public hearings, wetlands studies and preparation of a new environmental impact statement, which could take up to three years.

New methods treat sewage plant discharges

Companies marketing two recent developments in waste treatment technology claim they can solve problems caused by discharges from sewage treatment plants. One process disposes of sludge by mixing it with shredded solid waste and turning it into pasteurized compost. The other uses a new, less expensive method to generate ozone for disinfecting the effluent, thus eliminating the carcinogens formed in chlorine disinfection.

Using ozone for disinfection, while effective, has been considered to be too expensive. The new prototype system produces ozone directly in untreated air with a miniaturized high-volume electron beam generator. Previously, ozone was formed by sending a high-voltage alternating current through air that has been refrigerated and dried. The new system's developers, Accelerators Inc., Austin, and RP Industries, Inc., Hudson, Mass., say it will disinfect effluent for about one-third the cost of chlorination.

As a demonstration, the U.S. Environmental Protection Agency is funding a $200,000 installation that will disinfect 1 mgd at a plant in Marlboro, Mass.

Using sludge for compost has also been around for a long time, but a system developed in West Germany combines dewatered sludge with shredded, nonrecyclable solid waste—instead of the usual wood chips, which have to be bought. The system claims to end the unpleasant odors that accompany land application. The system, distributed in this country by American Resources Recovery Corp. (ARRCO), McLean, Va., separates and processes large quantities of the sludge-refuse mixture into 25-lb briquettes. This allows natural aerobic curing (for two to three weeks) and eliminates the odors caused by anaerobic decay.

A system handling 480 tons per day would cost $4.3 million to build and about $6 per ton to operate, according to ARRCO. It has no contracts in the U.S., but two demonstration plants have been operating in Europe for a year.

GAO challenges EPA

Advanced sewage plants called more expensive than effective

After reviewing several plans for advanced wastewater treatment plants, the General Accounting Office (GAO) has recommended a moratorium on approval of new plans for their construction. Until the federal Envirohment Protection Agency (EPA) completes "intensive water quality cause and effect studies" and regional waste management plans, it should hold back on authorizing grants for the expensive plants, GAO says.

"Without reliable data and sound plans, the multimillion-dollar advanced waste treatment facilities being constructed may not be the most effective and efficient means for achieving water quality goals," the report says. GAO suggests that using alternatives to AWT plants—building low dams to aerate stream water, storing water in reservoirs for release during dry periods to dilute pollutants, and placing mechanical aerators in lakes, for example—could lower the huge cost of the nation's clean water program.

In the five states GAO studied, Maryland, Virginia, Idaho, Oregon and Washington, communities are building or planning 26 advanced treatment facilities involving about $882 million in federal funds. "However, adequate water quality information on major causes of pollution was not available," the report says. Without it, "the justification for several of these advanced waste treatment facilities is questionable," GAO states.

Maryland, for example, has now changed its plans to build AWT plants with nitrogen removal facilities in the Patuxent River Basin. The state had plans for facilities costing $69 million in federal funds, but GAO's review of the information justifying construction of the plants indicated that a less expensive program, probably phosphorus removal, could also improve water quality in the Patuxent. Maryland is deferring construction of the nitrogen removal process, thereby saving $13.5 million in federal funds for use on other projects.

GAO faults EPA for failing to place a high priority on planning and gathering data on types, extent and sources of pollution. It recommends that EPA publish regulations on data collection, make sure all alternatives have been considered and that adequate information has been obtained before approving AWT plants and, if necessary, request funds from Congress to help states improve their planning and data collection.

EXHIBIT M-4

BuRec blasted

The independent panel's report sharply criticizing the Bureau of Reclamation design of Teton Dam in Idaho casts a shadow over existing and planned dams around the world (see p. 8). BuRec has designed more major dams than any other organization in the world. It is considered premier in its field. It has been adviser on many foreign projects and programs, including Australia's dramatic Snowy Mountains Project. In many respects, both literally and figuratively, the bureau has "written the textbook." Apparently, it needs rewriting.

On Teton, the independent panel faults BuRec on virtually every aspect of design. Interior's internal review group seems to agree and the bureau does not raise issue with the findings. Certainly all of BuRec's current projects will be called into question. That includes Auburn Dam, under construction on the American River near Sacramento. Towering 680 ft, it will be by far the highest concrete arch dam in the country, and it is already controversial because of the high seismicity in the northern California area. Others, including Corps of Engineers projects, will be more strongly challenged.

Greatly magnifying the potential impact of the Teton failure, there is a large international fraternity that has spread BuRec-influenced U. S. dam design and construction expertise around the world.

We were lucky on the Teton failure. Though it wreaked great damage, only 11 persons died. But Teton is not grand by dam standards, an earthfill only 305 ft high and reaching somewhat more than a half mile across the canyon. There are much higher, longer structures hanging over population centers. The Soviet Union is completing an earthfill 1,040 ft high that for a time will be the highest dam in the world.

BuRec seems determined to draw quick lessons from its errors on Teton. We hope they are widely broadcast.

Advanced waste treatment is special

The General Accounting Office (GAO) shows a wise skepticism in closely scrutinizing advanced waste treatment (see p. 12). Whether the moratorium the agency recommends on federal grants for such plants is the right tack may be debatable. But certainly the extraordinary costs of these extraordinary treatment methods should not be incurred until after all aspects and alternatives have received an extraordinarily close look.

It is doubtful that either advanced waste treatment or any of the alternatives mentioned by GAO can meet the present statutory goals. In fact it is doubtful whether anyone seriously expects the goals to be reached. But the estimated costs of complying with the law show that there is considerable incentive to try for the goals with something other than advanced waste treatment. The National Commission on Water Quality estimated that the capital expenditures required to meet the 1980 goals of PL 92-500 would include $24.8 billion in 1975 dollars for "treatment more stringent than secondary." By way of contrast, the comparable estimate for secondary treatment is only $10.8 billion.

Advanced treatment has a place in our pollution control efforts. For treatment of some wastes at some locations in some circumstances, some advanced waste treatment methods are sound, economically viable solutions that are not available with less advanced techniques. Those are the only cases in which public spending for advanced treatment is justified.

Right on, GAO

While on the subject of the General Accounting Office, let's urge that watchdog agency to run its own version of Sen. William Proxmire's (D-Wis.) boondoggle exposure program, the Golden Fleece awards. Almost any of the frequent research contract award announcements of the Health, Education and Welfare Department will provide likely candidates.

GAO might also find time to cosider whether the intent of Congress is really being implemented by the Consumer Product Safety Commission. When a federal bureaucracy busies itself with such basic parental jobs as keeping the kids out of the aspirin bottle, GAO should ask whether Congress really means families to buy that kind of help from Washington.

Some personal hazards are insidious enough to make it impractical for persons or families to protect themselves individually. (For an example, see the sprayed asbestos story on p. 10.) Then cooperative action is required and that's what governments are for.

Save the federal construction committee

If having a Construction Program and Policy Committee in the Department of Commerce is a good idea, it's worth fighting for. The fact that the Ford administration's proposed budget would wipe out the barely established committee along with the division within which it now resides (ENR 1/6 p. 7) need not be the end of it all.

It's very doubtful that the Office of Management Budget (OMB) fully considered the merits of the new committee in eliminating it. OMB was simply cutting everything it could to bring down the total deficit in Ford's final proposed budget.

The National Construction Industry Council, which sold Commerce Secretary Elliot Richardson on the merits of the construction committee as a focus of construction interests and information in the federal government, must begin selling again—to the Congress in its consideration of the budget as well as to the Carter administration whose Undersecretary of Commerce would chair the construction committee if it should be continued as it should be.

EXHIBIT M-5

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Philip L. Schneller P.E., President
James L. Russell, P.E. & L.S., Secretary
James G. Lauer P.E.

January 24, 1977

Indiana Stream Pollution Control Board
1330 West Michigan Street
Indianapolis, Indiana 46206

Attention: Mr. Oral Hert, Technical Secretary

Gentlemen:

On January 20, 1977, I was present along with one of my staff at the required public hearing on the Fort Wayne Facilities Plan for AWT and personally presented written and oral arguments against said project which I trust will be included in the record of same.

At this point in time I specifically request that the summary of the hearing that is to be included in the Facilities Plan be made available for inspection before it is included in said Plan.

My reason for being present at said hearing, and my resulting arguments against the proposal, is that the proposed if adopted may well have a drastic economic effect on two of our firms's smaller city clients that face much the same proposition, and on two Regional Sewer Districts we represent that are currently planning on tying into the Fort Wayne system, and on a Regional Sewer District of which I am a trustee that must tie into Fort Wayne.

You will note that my arguments as are on record against the proposal were more of a logical approach than of a technical nature, which all in our firm stand by; however, we also have some technical points to make--or questions to ask at least.

Also, an objection was made by representatives of the Isaak Walton League that the timing of publication of notice of the hearing was bad (during Holidays and that complete documents were not readily available for study, in which objection we concur. Further, the general manager of one of the largest if not the largest industrial users of the Fort Wayne system was not aware of the hearing.

Accordingly we comment and/or question the proposed as follows:

1. In your review of the Facilities Plan I suggest you secure the colored slides from the Engineers that depict the current conditions, and keep in mind that the current project being constructed is not even operational yet.

   Possibly these colored slides should even be included in the document!!

EXHIBIT M-6

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Philip L. Schnelker, P.E., President
James L. Russell, P.E. & L.S., Secretary
James G. Laur P.E.

2. I have in my possession a copy of a Facility Plan bearing a revised date of January 1974, in which the most cost-effective method of AWT was set forth as retention ponds, the public hearing on which was held in December of 1973.

   Next I have in my possession a copy of the State certification letter to the EPA dated May 6, 1974.

   The question is--what happened between January 1974 and May 1974, that I am told deleted the retention pond concept from the Facility Plan And did this require a public hearing And, I note the ponds were constructed with EPA and State grant funding!!

3. The State's position paper was read at the hearing and presumably will be included in the records; however, neither the State or EPA was represented at the hearing to present any case for the conclusions reached.

   The State and presumably the EPA's case was in essence presented by the Engineers; however, they were heavily dependent in their explanation that the proposed was a State and/or EPA requirement with little or no backup as to how the State and/or EPA arrived at their position. I am not faulting the Engineers for this as I understand the problem and have found myself in the same position many times.

   The question concerning this is why doesn't the State and EPA attend these hearings - or - if the end result has already been determined, as one speaker intimated, WHY EVEN HAVE THE HEARINGS!

4. Concerning the State's position paper there are some things that we take issue with and some that are even amusing.

   (a The ratio of BOD ultimate to BOD_5 will be set at 2.05!! At the allowable monthly average ultimate BOD set forth as 10 mg/l the BOD_5 would be 4.88!!

   These are very precise numbers and if the normally run BOD_5 test shows 4.91 will the City get a violation notice!!

   (b Please refer to the EPA manual of Methods for Chemical Analysis of Water and Wastes from which I have taken the following statement concerning the BOD test:

EXHIBIT M-7

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"Eighty-six analysts in fifty-eight laboratories analyzed natural water samples plus an exact increment of biodegradable organic compounds. At a mean value of 2.1 and 175 mg/l, the standard deviation was ±0.7 and ± 26 mg/l respectively (EPA Method Research Study 3)".

(c) The DO requirement of 7 mg/l at all times is the same as required for trout spawning (SPC 1R-3).
Only 6 mg/l is required for put and take trout fishing.

Is this to be taken to mean that the Maumee River was, or is intended to be, a trout stream?

Under some circumstances the 7 mg/l DO requirements could even be above the saturation point.

(d) The ammonia-nitrogen removal requirements are confusing and there is no explanation that I have seen that even attempts to explain why ammonia-nitrogen removal is required.

(e) Under item (2) of the position paper positive AWT designs are set forth, and I would like to conclude from it that the State and/or EPA are absolutely guaranteeing the expressed results desired under item (3), if said design(s) are implemented.

Before said agencies offer said absolute guarantee (money back of course), our firm has designed a dual-media filter that has been in operation for some 12 months now and we can state emphatically that the monthly average of BOD_5 will never get down to 4.88 mg/l. (10 mg/l of BOD_5 yes under ideal operating conditions)

In summary, I believe that special attention should be given to the City's financial consultant on this matter in his response to my question as to what point in time the whole system breaks down because of economic restraints. This proposal to spend some $16,000,000 additional in capital costs and an additional $2,900,000 annually for just O & M is most certainly deserving a more in-depth consideration than has been given, particularly considering the fact that the public was led to believe that the $35,000,000 now being spent was "the end" for awhile.

Trusting this transmittal may be of value, I remain,

Very truly yours,

Philip L. Schnelker, P.E.

EXHIBIT M-8

PHILIP L. SCHNELKER, INC. *Consulting Engineers*
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Philip L. Schnelker, P.E., President
James L. Russell, P.E. & L.S., Secretary
James G. Lauer, P.E.

cc: EPA, Mr. George Alexander, Regional Administrator
Board of Public Works, Fort Wayne
Board of Public Works, Warsaw
Board of Public Works, Kendallville
Maysville Regional Sewer District
Leo-Cedarville Regional Sewer District
H. B. Steeg & Associates
Izaak Walton League, attn: Ms. Jane Dustin

EXHIBIT N

BERNARD T. PERRY
Certified Public Accountant
SUITE 102
1815 NORTH MERIDIAN STREET
INDIANAPOLIS, INDIANA 46202
(317) 924-5543

January 19, 1977

Board of Public Works
City of Fort Wayne, Indiana
Fort Wayne, Indiana

Dear Sirs and Madam:

Pursuant to your instructions, I have undertaken a study of the estimated economic impact on consumer charges and costs of the Fort Wayne Water Pollution Control Utility arising from the Advanced Waste Water Treatment project as set forth in the amended Facilities Plan prepared for the City by the Engineers under date of January 4, 1977.

The purpose of this report as exhibited hereafter is to comply with EPA requirements under PRM-76-3 and to inform local users of the system owned and operated by the City of the estimated effect these proposed plant additions will have on the rates and charges of the Utility.

The beginning point for all calculations exhibited hereafter is the report of the writer submitted to EPA on behalf of the City entitled "Revised Supplemental Data, November 2, 1976". EPA staff has not yet accepted the user charges, capital charges, and industrial cost recovery charges proposed therein. However, in the opinion of the writer, these charges will not be materially altered as to total charges to domestic customers when finally approved by EPA.

In considering the enclosed schedules, it should be noted and understood that proration of costs and charges between domestic and industrial classes of customers in years beyond present rate schedules are based on allocations made to arrive at present user charges, capital charges and industrial cost recovery charges. The assumption that future allocation ratios will match present ratios does not result, in the opinion of the writer, in material variances in allocation of data between classes of users.

Respectfully submitted,

Bernard T. Perry

BTP:jk
Encs.

EXHIBIT N-2

FORT WAYNE WATER POLLUTION CONTROL UTILITY

Fort Wayne, Indiana

Report on Estimated Economic Impact of Facilities Plan

January 20, 1977

EXHIBIT N-3

FORT WAYNE WATER POLLUTION CONTROL UTILITY

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EXHIBIT N-9 Estimated User & Capital Costs - Phases B & C - 1983

EXHIBIT N-10 Calculation of Estimated Industrial Cost Recovery Charges

EXHIBIT N-4

FORT WAYNE WATER POLLUTION CONTROL UTILITY
Fort Wayne, Indiana

Summary of Economic Impact of Adoption of Alternate A - Facilities Plan - Second Amendment

	Effective Date	Per Annum Total	Domestic	Commercial & Industrial
A. Total Additional Costs				
Operation & Maintenance	1978	447,417	362,408	85,009
	1983	2,905,450	2,353,415	552,035
		3,352,867	2,715,823	637,044
Replacement Costs	1978	62,490	50,617	11,873
	1983	523,175	423,772	99,403
		585,665	474,389	111,276
Local Capital Costs	1978	20,550	17,775	2,775
	1983	166,500	144,025	22,475
		187,050	161,800	25,250
Total Impact - $		4,125,582	3,352,012	773,570
B. Summary of Estimated Rate Per 100 Cu. Ft. of Usage				
Estimated Present User & Capital Charge as Submitted by Ft. Wayne to EPA		31.0	32.0	26.1
After Completion of 1977 Plant Improvement		45.1	45.9	41.4
After Phase A - 1978		49.5	50.1	46.1
After Phases B & C - 1983		79.0	79.1	78.6
C. Summary of Estimated Rate Present Rate Equal 100%				
Present Proposed User Charge		100.0	100.0	100.0
After Completion of 1977 Plant Improvement		145.4	143.4	158.6
After Phase A - 1978		159.6	156.5	176.6
After Phase B - 1983		254.8	247.2	301.1

EXHIBIT N-5

D. Typical Domestic User Billing (Based on 1500 Cu. Ft./Month)	Monthly Bill - $
Present Proposed User Charge	4.80
After Completion 1977 Plant Improvement	6.89
After Phase A - 1978	7.52
After Phases B & C - 1983	11.87

E. Estimated Industrial Cost Recovery Charges - Per Unit of Flow Capacity	Cents per 100 cu. ft.
After Completion of Plant - 1977	2.86
Phase A - 1978	3.00
Phase B and Phase C - 1983	4.16

EXHIBIT N-6

FORT WAYNE WATER POLLUTION CONTROL UTILITY
Fort Wayne, Indiana

Statement of Estimated Allocated User and Capital Costs
Present Plant in Service

Cost Classification	Total	Domestic	Commercial & Industrial
User Costs			
Collection Costs			
Operation & Maintenance	817,247	632,549	184,698
Replacement	539,873	484,401	55,472
Total Collection Costs	1,357,120	1,116,950	240,170
Treatment Costs			
Operation & Maintenance	911,583	788,519	123,064
Phosphorus	232,656	170,770	61,886
Replacement	235,969	181,886	54,083
Total Treatment Costs	1,380,208	1,141,175	239,033
Administrative Costs	716,040	665,404	50,636
Gross User Costs	3,453,368	2,923,529	529,839
Less: Estimated Direct Revenue Deductions	(175,895)	(121,370)	(54,525)
Net User Costs	3,277,473	2,802,159	475,317
Capital Costs			
Debt Service, Revenue Bonds - 1959, 1961, 1970	489,186	423,146	66,040
Total User and Capital Costs - Present Plant	3,766,659	3,225,305	541,357
Estimated User and Capital Charge - (cents/100 cu. ft.)	31.0	32.0	26.1

EXHIBIT N-7

FORT WAYNE WATER POLLUTION CONTROL UTILITY
Fort Wayne, Indiana

Statement of Estimated Allocated User and Capital Costs After Completion of 60 MGD Capacity in 1977
EPA Grant C 180538 01

Cost Classification	Total	Domestic	Commercial & Industrial
User Costs			
Total Collection Costs (Per Exhibit N-6)	1,357,120	1,116,950	240,170
Total Treatment Costs (Per Exhibit N-6)	1,380,208	1,141,175	239,033
New Plant-Operation & Maintenance	203,000	175,600	27,400
-Replacement	901,862	695,154	206,708
Pro Forma Treatment Costs	2,485,070	2,011,929	473,141
Administrative Costs	716,040	665,404	50,636
Gross User Costs	4,558,230	3,794,283	763,947
Less: Estimated Direct Revenue Deductions	(175,895)	(121,370)	(54,525)
Net User Costs	4,382,335	3,672,913	709,422
Capital Costs			
Debt Service, Revenue Bonds - 1959, 1961, 1970	489,186	423,146	66,040
Debt Service, Revenue Bonds - 1975	612,000	529,380	82,620
Total User and Capital Costs- 1977 Plant	5,483,521	4,625,439	858,082
Estimated User and Capital Charge (cents/100 cu. ft.)			

EXHIBIT N-8

FORT WAYNE WATER POLLUTION CONTROL UTILITY
Fort Wayne, Indiana

Statement of Estimated Allocated User and Capital Costs After Completion of Proposed Advanced Waste Treatment Facilities - Phase A - 1978

Cost Classification	Total	Domestic	Commercial & Industrial
Net User Costs - Exhibit N-7	4,382,335	3,672,913	709,422
Phase A (Facilities Plan)			
Additional Operation & Maintenance	447,417	362,408	85,009
Additional Replacement Costs	62,490	50,617	11,873
Adjusted Net User Costs	4,892,242	4,085,938	806,304
Capital Costs			
Debt Service - Revenue Bonds 1975 & prior	1,101,186	952,526	148,660
- Revenue Bonds 1978	20,550	17,775	2,775
Total User & Capital Costs - 1977 Plant & Phase A	6,013,978	5,056,239	957,739
Estimated User & Capital Charge-(cents/100 cu.ft.)	49.5	50.1	46.1

EXHIBIT N-9

FORT WAYNE WATER POLLUTION CONTROL UTILITY
Fort Wayne, Indiana

Statement of Estimated Allocated User and Capital Costs
After Completion of Proposed Advanced Waste Water Treatment
Facilities - Phases B & C - 1983

Cost Classification	Total	Domestic	Commercial & Industrial
Net User Costs - Exhibit C	4,892,242	4,085,938	806,304
Phases B & C (Facilities Plan)			
Additional Operation & Maintenance	2,905,450	2,353,415	552,035
Additional Replacement Costs	523,175	423,772	99,403
Adjusted Net User Costs	8,320,867	6,863,125	1,457,742
Capital Costs			
Debt Service - Revenue Bonds 1975 & prior	1,101,186	952,526	148,660
- Revenue Bonds 1978	20,550	17,775	2,775
- Revenue Bonds 1983	166,500	144,025	22,475
Total Capital Costs	1,288,236	1,114,326	173,910
Total User and Capital Costs - 1983	9,609,103	7,977,451	1,631,652
Estimated User and Capital Charge - (cents/100 cu.ft.)	79.0	79.1	78.6

EXHIBIT N-10

FORT WAYNE WATER POLLUTION CONTROL UTILITY

Fort Wayne, Indiana

Calculation of Estimated Industrial Cost Recovery Charges

	Total $	Recoverable Amount Per Annum	Charge Per Unit of Flow Capacity (1)
EPA Grant Funds			
- Grant C 180538 01	25,060,275	835,342	2.86
- Phase A (Facilities Plan)	1,253,250	41,775	.41
- Phase B & C (Facilities Plan)	10,149,375	338,313	1.16
	36,462,900	1,215,430	4.16

(1) Based on 60 MGD for 365 days expressed in cents per 100 cu. ft.

EXHIBIT O-1

FORT WAYNE CHAPTER
Izaak Walton League of America, Inc.
DEFENDER OF SOIL, WOODS, WATERS AND WILD LIFE
17100 GRIFFIN RD., HUNTERTOWN, INDIANA 46748

PRESIDENT: FRANK A. WEBSTER
306 UTILITY BUILDING
FORT WAYNE, INDIANA 46802

CITY OFFICE
[illegible] STREET
FORT WAYNE, INDIANA 46808

BOARD OF PUBLIC WORKS
RECEIVED
JAN 31 1977

January 28, 1977

Henry P. Wehrenberg, Chairman
Board of Public Works
City of Fort Wayne
City-County Building
Fort Wayne, IN 46802

ADDITIONAL COMMENTS FOR THE RECORD OF THE PUBLIC HEARING ON THE FORT WAYNE FACILITIES PLAN, HELD JAN. 20, 1977

The Clean Water Committee, Fort Wayne Chapter, IWLA wishes to thank the City for finally putting the Facilities Plan into the Government Depository at the Public Library for the use of citizens who do not have time during the day to get to the city offices to read and study material. This should be an automatic action every time there is to be a Public Hearing as part of the city's public participation commitment.

We do object to the fact that the Information Sheet available to attendees at the Hearing, if they could see where to pick it up, was not available prior to the Hearing. This information was not in the Facilities Plan and very definitely should have been. Since the information was duplicated for passing out, why could it not have been available to interested citizens when they came to study the Plan? No citizen can comment adequately on any Plan when information is missing.

The map in the Facilities Plan itself is very difficult to read. As a matter of fact, it is incorrect. The large version of this map should have been in the proper city offices for public scrutiny.

The Committee strongly objects to the Modification Request appearing as it did when it did. There was no public mention made of this Request, and since the Stream Pollution Control Board had not publicly acknowledged receipt of it, it cannot be a legal action. The request information could have been woven into the context of the Plan.

Although the Position Statement sent in by Horace Smith of the Stream Pollution Control Board was stringent, it is not the official statement of that Board until it has been through the process of public comment time.

The Committee is still very concerned about toxic and hazardous materia that will get into the plant regardless of pre-treatment by industry. Accidents and spills have occurred in the past, as the Chief Waste Operator well knows, and they will occur in the future. Additionally, provisions have to be firm to allow for those poisonous materials from non-point source that will get into the system.

THE IZAAK WALTON LEAGUE OF AMERICA

EXHIBIT O-2

The Committee is additionally concerned about the amount of chlorine that will get into the system as it is used at various stages of treatment and for the breakdown of nitrogen. Too much chlorine produces chloroform in the effluent discharge, and we have neighbors downstream that drink the Maumee River water. Chloroform is known to be carcinogenic.

The extensive cost of electricity for the advanced treatment could be reduced very much by using the methane gas from the sewage operation. This should be part of the cost estimate figures to reduce the total electric co

An Industrial Surcharge for strength-of-wastes charges has been part of the Municipal Code by city ordinance since 1946 with definite charges fo BOD, COD, and Suspended Solids put into the Code in 1971. The Code further states that this surcharge is to be audited annually to determine if it is large enough to cover the costs of treating the extra wastes. This Committe has repeatedly been denied the right to see this industrial surcharge list and the charges collected. If, as we have been led to believe, this streng of=waste charge has never been collected, why not? This , then, is an unfair practice to cause the residential customer to bear all the cost of the plant expansion.

It is our understanding the proposed new rate structure for sewage service, surcharge rates and industrial cost recovery has been accomplished but awaits City Council action to be put into effect. None of this information was in the Facilities Plan. The "Effects on the User Charge and the Industrial Cost Recovery System", available only at the Hearing, is hardly adequate information. It does not provide information on the base rate per month, the minimum charge, who pays, nor the strength-of-waste charge rate, plus other data. If the User Charge and Cost Recovery System has been submitted to EPA, it should be public information and part of the Plan.

We request to see this document. Further we request an accounting of:

1) the volume of industrial wastes treated
2) what kinds of wastes are now treated at plant and kinds expected to be treated
3) the list of the industries sending their wastes to the plant
4) what charges these industries pay
5) a complete analysis of the cost and expenditures of the plant
6) what firms are required to pre-treat their wastes
7) the proper use and depositing of monies from the Cost Recovery as specified in PL 92-500, Sec. 204 (b)(1),(2), (3)

There should be an annual public audit of these monies.

The Clean Water Committee requests an accounting of all Grant monies received to date for each specific project, including the past projects that were eligible for reimbursement from federal funds.

The Environmental Impact Statement was not specific. Why were trees unnecessarily cut down along the river by the sludge lagoons? Why do sewer lines have to cross the river again and again unnaturally? In addition to extra expense, this kind of construction in a river greatly upsets the rive bed for a long time, it upsets life in and on the river and sends more silt downstream to be dredged out at the harbor at Toledo at great expense. The effect of future growth on the treatment plant was not covered, nor wer land use or transportation needs addressed.

EXHIBIT C-3

One vital fact missing from this Plan is a factual map depicting all of the sewers and interceptor lines, whom they serve, where they enter the treatment plant, location of all storm sewers, pumping stations, and the area of the county expected to be served by the Sewage Treatment Plant in Fort Wayne with the possible purchase of private utilities and use or non-use of their facilities. The 1971 Master Sewer Plan is obsolete and incorrect.

Contrary to views expressed at the Hearing, the Clean Water Committee believes in the purpose and goals of PL 92-500. For the health and benefit of all people, we want to see these goals reached within the time frame. Fort Wayne has to do its part -- and more. The Maumee River is a Water Quality limited stream; therefore Fort Wayne has to accept and abide by stricter limitations.

We request the State and Environmental Protection Agency withhold further funds from Fort Wayne until the Facilities Plan and corresponding documents are correct and complete.

Ethyle R. Bloch
Mrs. Ethyle R. Bloch, Co-Chm
Clean Water Committee
Fort Wayne Chapter IWLA
6340 Donna Drive
Fort Wayne, IN 46819

Jane H. Dustin
Mrs. Jane H. Dustin, Co-Chm.
Clean Water Commitee
Fort Wayne Chapter IWLA
1802 Chapman Road
Huntertown, IN 46748

cc: George Alexander, Administrator
Region V, EPA
Robert Carter, Staff, State Board of Health
Edwin C. Horn, Chief, Program Support Section, Region V, EPA
Frank A. Webster, Attorney, President Fort Wayne Chapter IWLA

EXHIBIT P

TOKHEIM
systems for the movement and measurement of liquids

TOKHEIM CORPORATION / 1600 WABASH AVENUE / FORT WAYNE, INDIANA 46801 / (219) 423-2552

January 31, 1977

BOARD OF PUBLIC WORKS
RECEIVED
FEB 1 1977

Board of Public Works
9th Floor, City County Building
Fort Wayne, Indiana

Attention: Mr. Henry P. Wehrenberg

Dear Sir,

As a representative of Tokheim Corporation, I wish to express our concern about the Advance Waste Treatment Program, presented in your Public Hearing, Thursday, January 20, 1977.

Due to the short notification of this hearing and it's technical content, we are not in the position to make a direct comment concerning the Advance Waste Treatment Program. We can only support those that should be knowledgeable on the subject.

During the meeting, Mr. Joe Moreale, Superintendent of City Utilities and Mr. Paul Brunner, Superintendent of the Pollution Control Plant, opposed this proposal. They considered the requirements to strict and expensive. They had doubts that they could measure the end results as required by Indiana Stream Pollution Control Board and were concerned with the high cost to meet these requirements.

In reviewing the information passed out to us, I was able to calculate the economic impact this program will have on Tokheim Corporation. We are very much concerned about costs that will triple or quadruple in the next 6 years. Each industry in Fort Wayne strives to make a profit. If we don't make a profit, we make changes that will provide us a profit or go out of business.

This proposed project is placing a heavier burden on existing Fort Wayne Industry and will be a determent to new industries looking at Fort Wayne for a home. We feel that this proposal is another step in making Fort Wayne a difficult place to maintain an industry and will discourage new industry from locating here.

Under these circumstances, we support your operating people and wish to add our support to their objection to this project.

TOKHEIM CORPORATION

R. E. Macy
Manager, Facilities

EXHIBIT Q

FALSTAFF BREWING CORPORATION 1025 GRANT STREET P.O. BOX 926 FORT WAYNE, INDIANA 46801

January 28, 1977

NOTED

☐ H.P.W.

☐ E.H.L.

☐ M.GS.

BOARD OF PUBLIC WORKS
RECEIVED
FEB - 1 1977

Board of Public Works
One Main Street
Fort Wayne, Indiana

Gentlemen:

The current user fees and other taxes imposed on our Fort Wayne operations exceeds those on any other Falstaff plant in the nation. It is becoming increasingly difficult to maintain a brewery in Fort Wayne.

For the Indiana State Board of Health and E.P.A. to seek unattainable* discharge limitations on the Fort Wayne NPDES permit will make Fort Wayne incompatible with any high volume water user industry.

It is probable that Falstaff will find the projected sewer rate increase in this city an intolerable situation.

It is with great concern that I urge the City and its industry to use all means at its disposal to stop this assault upon our existance as a competitive City.

* The unattainability of the NPDES permit discharge limitations has been testified to during the public hearing by Paul Brunner, Superintendent Fort Wayne W.P.C. Plant; Phil Schnelker, Consulting Engineer; and others.

ET/bam

Respectfully Yours,

FALSTAFF BREWING CORPORATION

Earl Thompson

Plant Manager

EXHIBIT R-1

ATTORNEYS

H. Hugh Kennerk
James F. Dumas
Larry J. Burke
Vincent J. Backs
Stephen D. Long
William N. Salin
Robert Owen Vegeler

KENNERK, DUMAS, BURKE & BACKS
A PROFESSIONAL CORPORATION
2120 FORT WAYNE NATIONAL BANK BUILDING
FORT WAYNE, INDIANA 46802

219-743-0171

January 24, 1977

BOARD OF PUBLIC WORKS
RECEIVED
JAN 26 1977

Board of Public Works
Room 920
City County Building
One Main Street
Fort Wayne, Indiana 46802

Attention: Mr. Henry Wehrenberg

Dear Mr. Wehrenberg:

Mr. Pitzer of Water Pollution Control requested an opinion as to the legality of the Board of Public Works conducting a public hearing and obtain a grant from the United States Government for the expansion of improvement of the sewage facilities of that department.

It is my opinion that the Board of Public Works has the power to enter into a contract with the United States Government or one of its agencies for such a grant. Furthermore, public hearings to gain community participation or pursuant to federal regulations are a reasonable exercise of the powers of the Board of Public Works.

The powers of the Board of Public Works in these matters is governed by I.C. 19-2-5-1 et seq. I.C. 19-2-5-3 provides "the construction, acquisition, improvement, equipment, custody, operation and maintenance of any such works shall be under the supervision and control of the Board.....".

I.C. 19-2-5-5 provides that "the Board may enter into all contracts or agreements necessary or incidental to the performance of its duties in the execution of its powers in carrying out the provisions of this chapter (19-2-5-1----19-2-5-30). Any contract relating to the financing of the acquisition or construction of any works or to any trust indenture authorized by this chapter shall be approved by the Common Counsel of the City or the Board of Trustees of the town before the same shall be effective, however."

The same section of the statute goes on to state "after completion of the works or its acquisition, the Board shall operate, manage and control it and may order and complete any extensions or improvements to the works deemed necessary by the use of any available funds or funds to be made available under this or any other chapter. The Board shall adopt rules and regulations for the use and operation of the works or of other sewers and drains connected therewith

EXHIBIT R-2

so far as they may effect the operation of the works."

While it might seem to require the approval of the Common Counsel for future "construction", I think the implication of the statute is that only the original acquisition or original construction of any works is to be approved by the Common Counsel. Therefore, it would be my opinion that the Board would have the authority to enter into a contract with the United States Government or an agency thereof in order to obtain federal funds to complete an extension since the original purchase or construction of the works has been completed. In order, however, to obviate any possible objection, the contract could be approved by the Common Counsel, if at all possible.

I.C. 19-2-5-11 specifically authorizes grants or loans from the United States Government or any agencies thereof for the improvement, enlargement, or extension of the works.

If the agreement with the United States Government or any agency thereof is to be executed by the Board of Public Works, the chairman or a majority of the members of the Board of Works should sign the agreement. I believe the Board of Works has adopted rules authorizing the execution of contracts by one or more members. These rules would govern whether the contract should be signed by the chairman or by other members of the Board. Such rules are made pursuant to I.C. 18-1-6-14 and should be of record with the clerk pursuant to that statute.

If I may be of any further assistance, I will be available at your convenience.

Very truly yours,

KENNERK, DUMAS, BURKE & BACKS
A Professional Corporation

Stephen D. Long

Stephen D. Long

SDL/pmg

EXHIBIT S-1

BOARD OF PUBLIC WORKS
RECEIVED
JAN 31 1977
H.P.W.

3719 Bramble Crest Drive
Fort Wayne, Indiana 46815

January 29, 1977

Mr. Henry P. Wehrenberg
Chairman, Board of Public Works
Fort Wayne, Indiana

Dear Mr. Wehrenberg:

As a citizen whose property is in an area under active negotiation for prompt inclusion into the service area of the Fort Wayne City Utilities, I wish to comment on the Facilities Plan for Wastewater Treatment Second Amendment. I am a professional chemist who has been actively involved in wastewater treatment facilities from time to time over the last twenty-two years. I feel I was one of the few people who sat through the January 20, 1977 hearing, and actually knew that in the chemistry of the aerobic ammonia-nitrogen removal process, two biochemical reactions must take place, i. e., first nitrite must be created as the intermediate product, before the more stable nitrate can be formed.

I feel that the Indiana Stream Pollution Control Board has not acted in a responsible manner in demanding that advanced wastewater treatment be continuously employed at the Fort Wayne treatment facility. They have not given adequate consideration to the condition of the receiving Maumee River with respect to its dissolved and suspended solids content, and other chemical and physical characteristics. They have also established a record of making contrary decisions in respect to other municipal systems which elute into similar receiving waters.

If the [illegible] in the wastewater constitutes a problem only at times of very low flow conditions, then the additional aeration for its elimination should only be employed at such times. There always has been a need for carrying out operations in a practical manner, and particularly now with the shortage of available energy, just to accept the laying down of a blanket rule, without having had all the facts taken into serious consideration, is yielding to irresponsible governmental bureaucracy. To seek the removal of the last traces of suspended solids by sand filtration, before mixing in the Maumee River, which carries perhaps a hundred-fold times as much suspended solids already, constitutes a complete lack of logic. The river's suspended solids fluctuation on an hourly basis, probably represents a factor equivalent to the treatment plant loading. And the cost of operating such extensive facilities must never have been taken into consideration with respect to the extent of improvement that is achievable.

EXHIBIT S-2

When industry is confronted with similar problems, meetings are arranged with responsible regulatory personnel, and harmonious conclusions are soon reached, because the industry representatives are in there fighting against every increased cost of running that business, while at the same time keeping in mind their responsibilities as reputable corporate citizens. That business still has to remain competitive in the marketplace, or their jobs vanish.

The conditions are drastically changed, however, for the consulting engineers representing the municipal interests, in reality, the fee paying property users. If these consultants fail to logically gain the necessary concessions, their jobs expand in size, and the fees gets fatter, because of increased work loads, so why should they have any incentive to keep any but the most obvious costs down. This leads to but one sad conclusion. Such consultants should be summarily dismissed and others who have acquired a consistent record of being successful in beating back unreasonable bureaucractic directives, should become their replacements. In the last resort, legal action in court should be taken, in the absence, necessarily, of those consultants who got us there in the first place.

Very truly yours,

Robert S. Olsen

EXHIBIT T -1

STATEMENT ON HISTORICAL/ARCHEOLOGICAL REVIEW

The 1966 Historical Preservation Act (PL 89-665) and Executive Order 11593 (May 13, 1971) require all federally funded, assisted or licensed projects be evaluated by the State Historic Preservation Officer. The purpose of this review is to identify properties on or eligible for the National Register of Historic Places so that they will not be adversely affected by proposed construction.

This project is intended to be implemented in a stage-wise manner with the construction activity involving each stage to be phased over a considerable time period. The amount of construction and earthmoving activity for each stage is estimated to be as follows:

Phase A - No significant area involving earthmoving because all construction activity is programmed to take place at existing Water Pollution Control Plant facilities. Work to be complete in 1979.

Phase B - No significant area involving earthmoving to take place at existing Water Pollution Control Plant facilities. Work to be complete in 1982.

Phase C - Construction activity confined to north bank of Maumee River directly across the river from the main part of the Water Pollution Control Plant in an area of 9 acres. Work to be complete in 1982.

A detailed reconnaissance of the area was recommended by Ms. Cheryl Ann Munson, Staff Archaelogist, at the Black Laboratory of Archaeology, Bloomington, Indiana, in a letter dated October 29, 1976. This reconnaissance effort is programmed to go on in the same time frame as the physical topographic survey of the area affected by new construction. This activity will be covered in the Step 2 application for design engineering funding for Phase C.

BLOOMINGTON, INDIANA 47401

TEL. NO. 812—337-9544

EXHIBIT T-

BOARD OF PUBLIC WORKS
RECEIVED
NOV 3 1976

October 29, 1976

Mr. Henry P. Wehrenberg
The City of Fort Wayne
Board of Public Works
City-County Building
One Main Street
Fort Wayne, Indiana 46802

Re: Advanced Waste Treatment Facility Plan - Project No. C-180774-01

Dear Mr. Wehrenberg:

In regard to the above referenced project a review of our files indicates that our knowledge of the project area is not sufficient to determine the projects impact on prehistoric cultural resources. However, the project location is topographically suitable for sites of prehistoric occupation.

In order to comply with federal regulations and guidelines regarding adverse affects on archaeological sites or prehistoric cultural resources, an archaeological reconnaissance will be necessary. A reconnaissance will determine the presence or probable absence of such resources. If any are located, limited test excavations may be necessary to determine project impact and the elgibility of sites for nomination to the National Register of Historic Places. Reconnaissance will provide you with the necessary data for a Draft Environmental Impact Statement and indicate compliance with the National Historic Preservation Act, Executive Order 11593, the National Environmental Policy Act, and Public Law 93-291.

A number of professional archaeologists in the state, associated with the major universities, can accomplish reconnaissance work. In addition, the Laboratory has personnel who can perform this work at a rate of $150 per day. We suggest that you contact Professor James O. Bellis, Dept. of Soc/Anthropology, Univ. of Notre Dame, Notre Dame, Indiana 46556, who is closer to your project area.

If you have any questions regarding this recommendation please contact me.

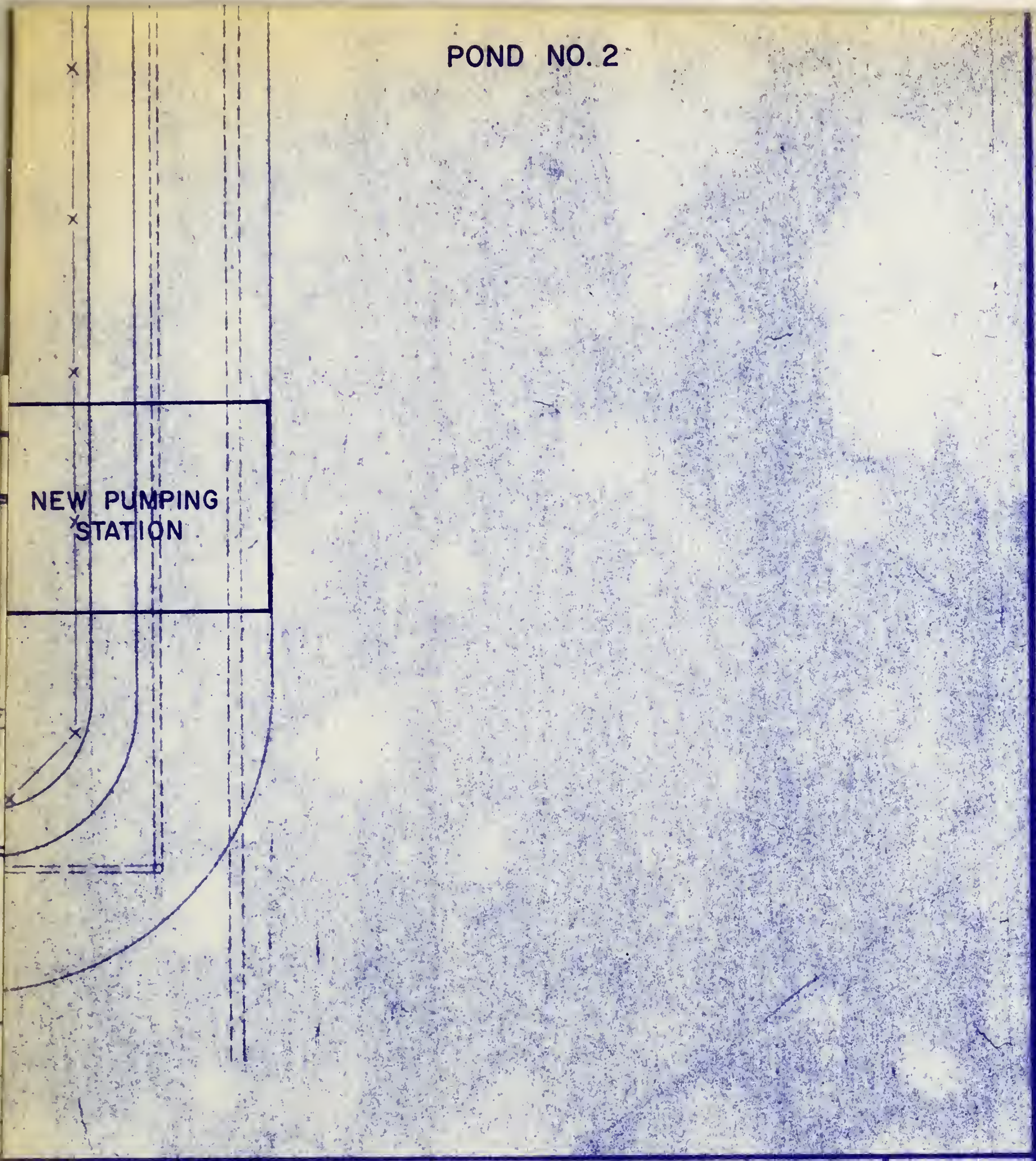
Sincerely,

Cheryl Ann Munson,
Staff Archaeologist

CAM/mh

cc: J. Bellis

~~Questions about the review process should be directed~~



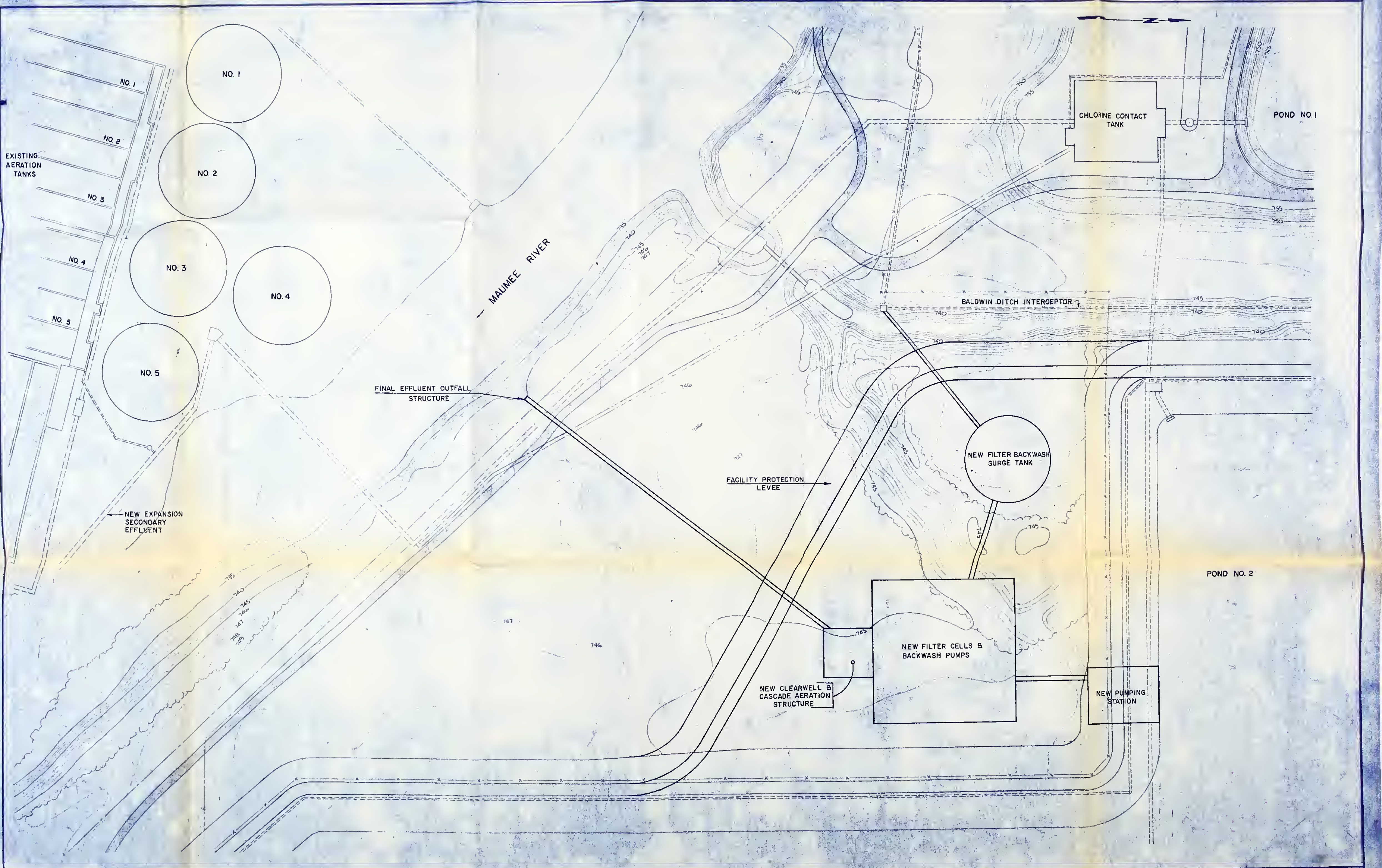
CITY OF FORT WAYNE, INDIANA
ADVANCED WASTE TREATMENT STUDY

NORTH BANK AWT AREA SITE PLAN

RECOMMENDED FACILITIES

SHEET NO.
FIGURE
V/2

SCALE
1" = 50'


N
EXISTING AERATION TANKS
NO. 1
NO. 2
NO. 3
NO. 4
NO. 5
NO. 1
NO. 2
NO. 3
NO. 4
NO. 5
MAUMEE RIVER
FINAL EFFLUENT OUTFALL STRUCTURE
NEW EXPANSION SECONDARY EFFLUENT
FACILITY PROTECTION LEVEE
CHLORINE CONTACT TANK
POND NO. 1
BALDWIN DITCH INTERCEPTOR
NEW FILTER BACKWASH SURGE TANK
POND NO. 2
NEW FILTER CELLS & BACKWASH PUMPS
NEW CLEARWELL & CASCADE AERATION STRUCTURE
NEW PUMPING STATION
735
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SYMBOL	REVISIONS	BY	DATE	APPROVED

DESIGNED	RDB
DRAWN	FLYNN
TRACED	
CHECKED	
APPROVED	DATE
BY	

HNTB

HENRY B. STEEG & ASSOCIATES

A DIVISION OF HOWARD NEEDLES TAMMEN & BERGENDOFF

Engineers

4930 NORTH PENNSYLVANIA STREET, INDIANAPOLIS, INDIANA 46205

JOB NO. [illegible]

DATE 6-2-76

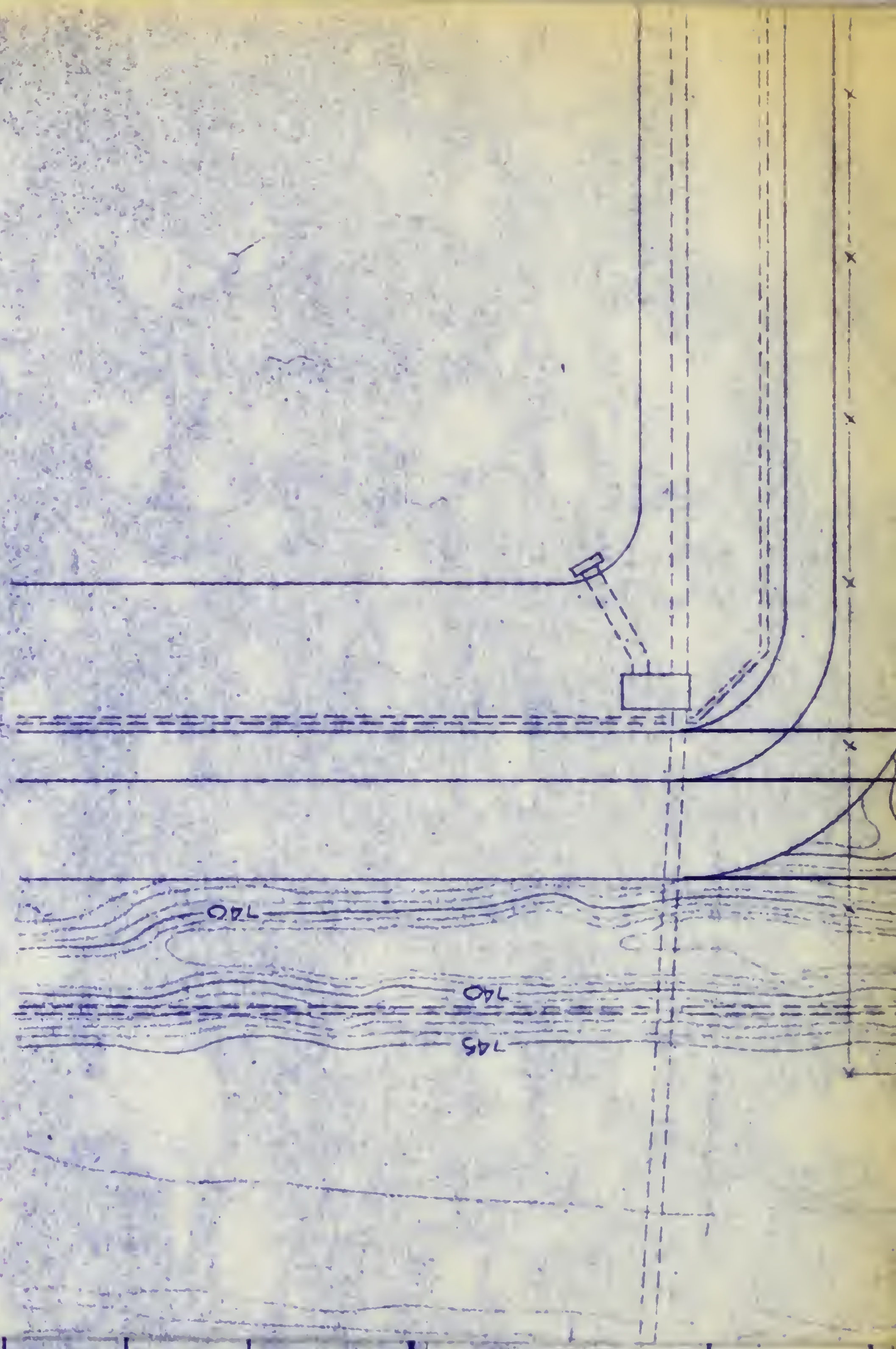
CITY OF FORT WAYNE, INDIANA
ADVANCED WASTE TREATMENT STUDY

NORTH BANK AWT AREA SITE PLAN

RECOMMENDED FACILITIES

SHEET NO.
FIGURE V/2

SCALE 1" = 50'



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DATE
6-2-76

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